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RAISING FUR-BEARING ANIMALS



America was the fur trapping field of the world for nearly three hundred years, until the ax of civilization felled the forest haunts of the animals, and eager trappers trailed them to the brink of extinction for the tempting premium on their pelts.

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RAISING FUR-BEARING ANIMALS

By
HARDISON PATTON



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CHICAGO
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HARDISON PATTON

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PREFATORY NOTE

UNPRETENTIOUS of the knowledge of persons accredited with scientific zoological learning, it shall be my effort to offer the essentials to successful fur raising in simple English phraseology, omitting the Greek and Latin appellatives usually employed in the language of scientific writers on technical subjects, presenting a volume more valuable to its readers than if it were enshrouded in the vocabulary of conventional or professional diction.

When I first began considering the possibility of a domestic production of furs through scientific propagation of fur-bearing animals, I was a subject of ridicule by the skeptical, who, having no previous occasion to give it thought were doubtful of the wisdom of my efforts, merely conceding it to be an intensely interesting theme of doubtful value.

Continuing my research through accumulated data from points diversely, I was soon confronted with possibilities in fur raising so promising that I could not help believing that something must come from it, because the increase of these animals is so great after a few seasons of compound propagation, with a cost of maintenance so small, that in spite of some losses (as there would be in any other business) there would most assuredly be enough left in excess of expenses to provide an attractive recompense for the time and effort devoted to it.

Actuated by the results of my own experiments and those of others, that so decisively proved the feasibility

PREFATORY NOTE

of a domestic production of furs, I am prompted to compile information of infinite value to the beginner in fur raising, as well as to those now engaged in it in order to further their common interests and materially assist in establishing fur raising as a commercial industry into which it is destined to develop within the near future in order to meet the demands of an established need.

If, for no other than humane reasons, information embodied in this volume should be responsible for a reasonable amount of the fur supply being produced under domestic control, ennobling us to another sphere above the ranks of barbarism by obviating to some extent, the cruelties of the steel trap, it will accomplish its purpose with a full measure of compensation for the work I have devoted to it.

HARDISON PATTON.

Inasmuch as the information embodied in this book cannot be procured from any other volume, the real worth of it will be remembered by its readers long after they have forgotten the cost of it.

TABLE OF CONTENTS

	PAGE
Prefatory Note	v
List of Illustrations	viii
My Early Experiences	1
Evolution of the Fur Business	19
The Fur Supply	25
Trapping	26
Fur Ranching in General	29
Furs on the Waste Land of Farms	41
Habitat and Fur Effect	45
Ranch Raised Furs Superior to the Wild	45
Procuring the Breeding Stock	50
The Back Yard Ranch	52
The Selling Price of Pelts	53
Selling Prices of Live Animals	54
Relative Durability of Furs	55
Table of Animal Increase	56
Deciding on Animals to Raise	57
When the Selling Price of Furs Is Low	59
Study the Animals and Their Needs	60
Pantomimic Language of Wild Animals	61
General Fence and Pens Construction	63
Animal Dens Construction	67
Family Developing Pens	68
The Muskrat in the Wilds	72
Under Semi-Control, Plan Number One	95
Under Full Control, Plan Number Two	100
Dry Land Ranching (theoretical)	103
Catching in Quantity	104
Nest Boxes	106
Breeding	108
Feeding	111
Caring for the Young	114
Killing, Without Pain or Struggle	114
Skinning and Curing	115
Diseases (none fatal)	116
The Fox in the Wilds	118
The Blue Fox	124
The Domesticated Silver Fox	124
Ranching	127
Locating the Ranch	131
Enclosures	132
Dens	142
Escaped Animals	149
Developing Foxes for Furs Only	150
Feeding	154

The Domesticated Silver Fox	PAGE
Mating	159
Breeding	160
Caring for the Prospective Mother	165
Caring for the Young	167
Feeding the Young	174
Diseases	175
Killing Without Pain or Struggle	182
Skinning and Curing	182
Selling the Pelts	185
Shipping the Live Animal	186
The Mink in the Wilds	188
Catching the Breeding Stock	196
The Mink in Captivity	197
Ranching	198
Backyard Production	202
Enclosures	206
The Barn System, Plan Number One	208
Open Developing Field, Plan Number Two	212
Family Developing Pens, Plan Number Three	219
Nest Boxes	222
Feeding	225
Breeding	231
Caring for the Young	235
Diseases	242
Skinning and Curing	245
The Raccoon in the Wilds	246
In Captivity	252
Ranching	252
Enclosures	255
Nest Boxes	258
Feeding	259
Breeding	262
Care of the Young	265
Killing, Skinning and Curing	266
Diseases	268
The Otter in the Wilds	269
Captivity	277
Ranching	277
Enclosures	278
Nest Boxes	279
Feeding	279
Breeding	280
Diseases	281
The Sea Otter	281
The Marten in the Wilds	282
In Captivity	286
Ranching	286
Enclosures	287
Nest Boxes	288
Feeding	289

TABLE OF CONTENTS

xi

	PAGE
The Marten	
Breeding	290
Care of the Young	292
The Pekan (Fisher) in the Wilds	293
Under Control	297
Nest Boxes	298
Feeding	298
Breeding	298
Care of the Young	299
Skinning and Curing	299
Diseases	299
The Ermine in the Wilds	300
Enclosures	301
Feeding	302
Breeding	302
Care of the Young	302
Skinning and Curing	302
The Beaver in the Wilds	303
Under Control	312
Ranching	313
Enclosures	313
Dens	314
Breeding	316
Feeding	317
Care of the Young	317
Diseases	318
Skinning and Curing	318
The Opossum in the Wilds	320
Under Control	324
Enclosures	325
Dens	325
Feeding	326
Breeding	326
Care of the Young	327
Skinning and Curing	327
The Skunk in the Wilds	329
Under Control	341
Ranching	342
Backyard Production	344
General Enclosures	347
Breeding Pens	351
Inside Enclosures	352
Nests for Breeding Pens	355
Dens for the Main Enclosure	357
Breeding	358
Feeding	361
General Care of	364
Caring for the Young	369
Mothers Eating Their Young	370
Cannibalism in the Main Enclosure	370
Deodorizing	371

	PAGE
The Skunk	
Diseases	377
Skinning and Curing	382
Things to Remember	382
The Cavy (Guinea-Pig)	385
Types of	387
Sales Market	388
Selecting Breeding Stock	388
Hutches and Pens	389
Feeding	391
Breeding	392
Diseases	394
The Rabbit	395
Selecting the Breeding Stock	398
Feeding	399
Breeding	400
Caring for the Young	403
Hutches	404
Enclosures	405
Diseases	407
Handling	412
Rabbits and Hares	412
The Larger Animals	416
The Karakul	417
Fur Raising in the South	418
Developing Young Animals	420
Animal Biscuits	420
Caloric Food Values	421
Caloric Food Requisites	422
Lime Water, The Use of	423
Lime Water, To Make	424
Developing the Fur	424
When Furs Prime	426
Marking Fur Animals	427
Killing Fur Animals, Humanely	428
Skinning and Curing Otters, Martens, Minks and Fishers	430
Curing Pelts in General	432
Pelt Stretchers	433
Curing and Dressing Pelts with the Fur on	437
Scent Baits, To Make	439
Odor on Pelts, To Remove	440
Blood Stains, To Remove	440
Grading Pelts at the Ranch	441
Keeping Furs and Pelts	441
Cleansing and Refreshing Pelts	442
Diseases of Fur Animals, and the Remedies	443
The Quarantine Station	450
Fifty Fur Raising Facts	452

LIST OF ILLUSTRATIONS

Sketches entered in this book are from hand drawings because it would be practically impossible to secure photographs which would show the constructional plans as they should be shown, or that would show the animals in poses demanded by the explanatory text. These animals move almost incessantly, making desirable photographs difficult to procure.

	PAGE
Primitive America	<i>Frontispiece</i>
Camp on the Ranch	2
Camp in the Canyon	7
Killing a Mountain Lion	9
Experiment in the Indian Territory	11
A Ranch Upon the Roof	14
An Experimental Ranch in the Ozarks	15
A Hunting Lodge on Lake Huron	16
Furs for Adornment	21
Ranch on the Waste Lands of a Farm	42
Fur Ranch on a Worn Out Farm	44
General Fence and Pens Construction	62
Backyard Ranch in a City	66
Animal Dens Construction	67
Family Developing Pens	70
The Muskrat	72
A Typical Muskrat Marsh	75
Muskrats Become Sociable	77
Muskrat House and Its Entrance	78
Muskrat Houses on an Island	79
Muskrat House on a Log	80
After the Battle	82
Muskrat Den in a Creek Bank	84
Muskrat Gathering Food Under the Ice	85
Muskrat Oxygenizing Its Exhaled Breath	87
Muskrat's Hind Foot Not Webbed	89
A Theoretical Muskrat Ranch	93
A Semi-natural Muskrat Ranch	96
Breeding System for Muskrats	101
Nest Box for Muskrats	107
The Red Fox	118
Sly Fox in Ambush	119
A Relay Station	120
Strategy of the Fox	121
The Silver Fox	125
Underground Turn-in	133
Top and Surface Turn-in	134
A Fox Ranch Complete	136
Adjuncts to a Fox Pen	138
Fox Den	143
Fox Den, Improvised	147
A Fox House	148
The Mink	188

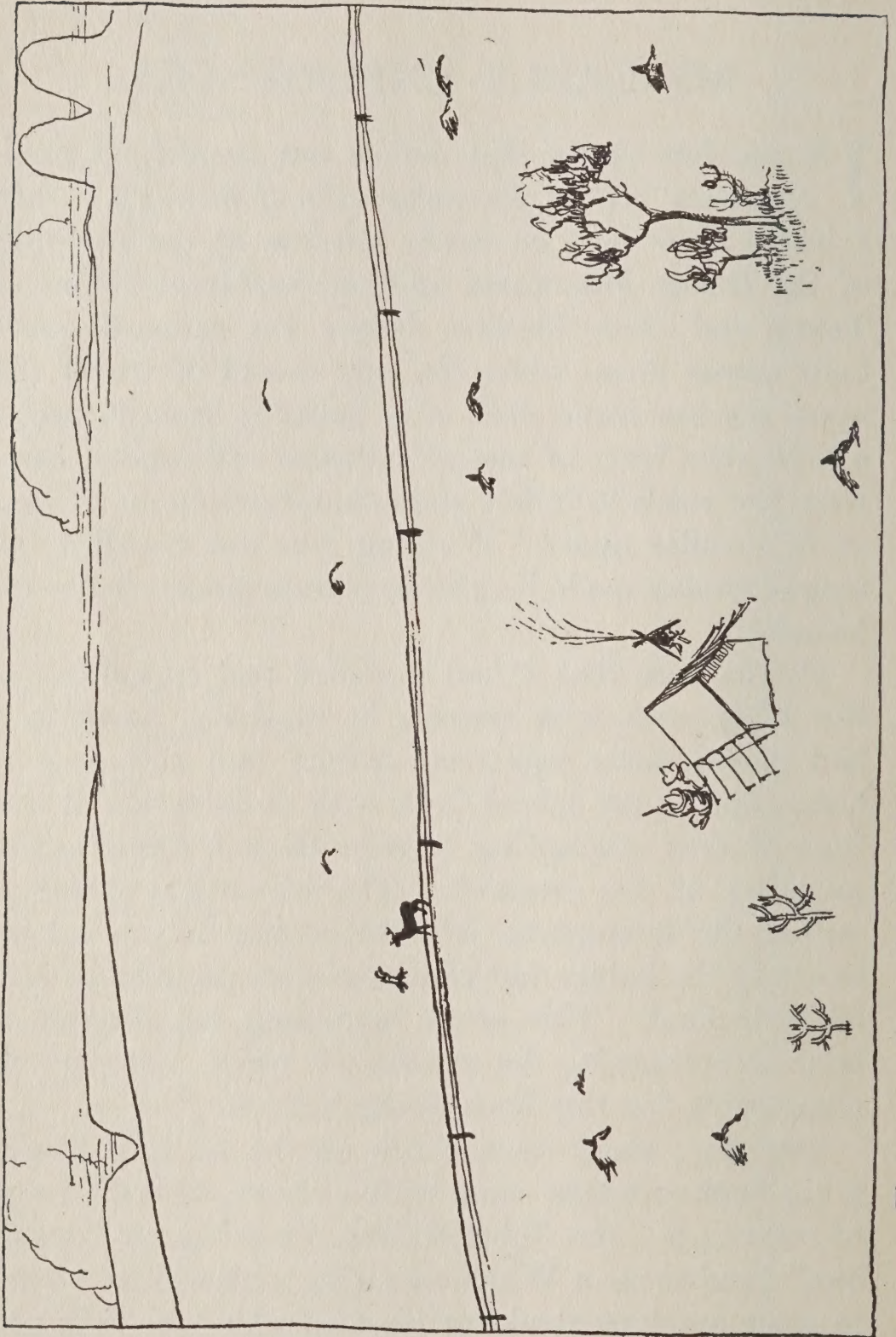
	PAGE
A Mink on His Food Route	192
Mother Mink and Family	194
Minks Become Friendly	200
The Backyard Minkery	202
Barn System Mink Raising	209
Mink Developing Field	212
Mink Pens for a Breeding Unit	215
Drop Doors for Mink Pens	217
Nest-Box for Minks	223
Transfer Box for Minks	238
Examining Box for Minks	239
A Happy Family of the Forest	246
Raccoons	248
Raccoon Pens Equipment	256
A Raccoon Ranch Complete	257
The Otter	269
Otter Sliding on the Ice	270
Otters "Shooting the Chutes"	270
Otters on the Toboggan	271
Otters, Fishing	276
The Marten	282
The Stone Marten	283
The Pine Marten	284
The Fisher	293
The Ermine	300
The Beaver	303
Beaver Dam	306
Beaver Building Its House	309
Beavers, Logging	311
A Young Beaver's Lunch	318
The Opossum	320
Opossums, Arboreal	321
A Joy Ride on Mother	322
"His Majesty" the Skunk	329
Split-cap Skunk	338
Markings of Skunks	339
Mother Skunk and Family	340
Young Acrobats	341
The City Skunk Yard	346
Skunk Fence Construction	348
A Skunk Ranch Complete	350
Interior Breeding Pens	352
Nest-Boxes for Skunks	355
Young Skunk Exerciser	356
Locating the Scent Sacs in Skunks	373
Incision to Scent Sac	374
Dislodging the Sac	375
Deodorizing Instruments	376
Guinea-Pigs	385
Nest-Boxes for Guinea-Pigs	390
The Rabbit	395
An Outdoor Rabbitry	404
A Weather Shed	406
Handling Rabbits	412
The Killing Box	429
Stretchers	436

MY EARLY EXPERIENCES

IN the few pages that follow are some fond reminiscences "out of the white halls of memory," when I was a mere boy, on cattle ranches, at the foot-hills of the Rocky Mountains and on the Great Plains of Texas and New Mexico, before the railroads were built across them, when the only means of travel was upon the hurricane deck of a bucking broncho across a timberless tract of mesquite-thorns and cactus; there were few roads to follow and homes were on an average of fifty miles apart. Walking was not crowded but long distances made it extremely unpopular—hence the broncho.

It was here that I had my first real experience in the wilds, with wild animals in captivity, however, I had raised some squirrels, rabbits and raccoons, at home, during my school days, with no intention at that time of ever attempting to raise them for commercial purposes or for research. The irresistible desire to unfold the strangeness of wild animal nature led me to study the habits and characteristics peculiar to each of their kind. This crude beginning led directly to later experiments, the results of which were purely responsible for this book being written.

One day, about noon, when on the Millsap Ranch, a big buck antelope came within reasonable rifle range of our camp. Mr. John Millsap, knowing my "deadly aim" handed me a Winchester rifle with which to bring in some antelope steak for his men who were then preparing to go on the round-up. With the fullest degree



The camp on the ranch where I had my first experience with wild animals, in the wilds.

of self-assurance and proud expectancy, I fired at the animal; but, to my utter bewilderment, the bullet struck a strand of newly built barbed wire fence, glanced off, missing the antelope entirely, but killed a jack-rabbit which was unobserved at the time and probably would have remained unseen had it not performed the acrobatic stunt of turning a complete somersault in the air when the bullet struck it.

When the cow-boys learned of the incident as they gathered at headquarters that evening, they sat around the penumbra of the camp fire and created a mock court commonly known among them as a "kangaroo court," at which I was tried for killing an innocent bystander (the jack-rabbit). After considerable confusion in court and much deliberation by the jury, I was, in view of my youth, acquitted on the grounds of "accidental homicide," on condition that I would bring in an antelope the next day. But, alas, the next and even the second day blended into the shadows of stilly night without the promised trophy; however, at the end of the third day, just as the sun was sinking over the rise of the Great Staked Plains, a bullet from my old Winchester rifle slew a fawn of the frying size.

I then found myself confronted with the problem of lifting the animal high enough to lay it across my pony's back so I could take it into camp. After considerable wasted energy in the attempt and loss of valuable time as the night was coming on, I happily conceived the idea of an improvised windlass by utilizing a limb of a mesquite tree, over which I threw my lariat and hoisted the antelope to an elevation slightly above my pony's back, then by lowering it slowly I eventually adjusted it across the pommel of my saddle where I tied it

securely with the saddle-thongs. By this time the twinkling little stars began to assemble in the unexplored fields of the universe; as there were no roads to follow I was guided to headquarters by the faint light of the camp-fire.

Procuring this antelope did not add materially to my reputation as a hunter, nor could it be considered a crafty achievement, for these animals were numerous there at that time, running in small herds over the great expanse of unfenced prairies where, because of the scarcity of men, they were seldom molested.

Almost all of that country, embracing thousands of square miles of fenceless and houseless prairie, is now under cultivation and wholly destitute of the wild animal life that then existed plentifully.

Rattlesnakes, owls, rabbits, antelopes and a multitude of prairie dogs could be seen at one inclusive scan of the prairies; the accompanying illustration does not exaggerate this very common sight as it existed at that time in the extensive valley lands at the foot of the plains, over which the view was broken only by a few scattering mesquites.

The chasm dividing the plateau shown in the illustration is known as Buffalo Gap, through which buffaloes were driven and slaughtered by thousands, for their skins, by men with rifles who stationed themselves at points of safety on the walls of the precipice.

In the background will be seen the Double Mountains appearing as two sky-scraping haystacks piercing the horizon from an apparently level prairie. Yet, upon closer approach their immediate surroundings become rugged and rocky.

The little prairie-dogs and the volcano-shaped mounds

which they build around the entrance to their burrows could be seen in all directions over the entire valley lands that lie directly at the foot of the plains. These animals do not live in colonies (generally referred to as "prairie-dog towns") as many persons believe, neither do snakes, owls nor rattlesnakes live with them; yet many visionary writers claim this to be true, in their articles on the subject, which is plainly a travesty on the virtues of reality—as barren of actual fact as is the fabled siren of the sea. Out of respect for the sincerity of delusioned writers of such articles, I would explain that that impression is readily created in the mind of the casual observer, or the passer-by, through an effectively executed little ruse on the part of both the owl and the rabbit in the pretense that they are diving into the depths of the earth, whereas, neither of them ever enters the burrows to a depth greater than a very few inches; their fear of attack from within by the prairie-dogs and of the continued approach of man, places them between two fires from which there is no side escape. Neither will a rabbit ever approach the crest of a burrow upon which an owl is perched, for owls eat both rabbits and prairie-dogs, while rattlesnakes would swallow the young of either. In fact, they are all bitter enemies and live their lives apart, as do wild animals of every other kind.

During those early years I whiled away some sunny summer days on another cattle ranch in the foot-hills of the Llano Estacado near the border of New Mexico (which was then a Territory); our camp provisions were stored beneath a precipice in the upper side-walls of the great Paladuro Canyon, where a Mexican adobe provided shelter from occasional rains. We used our sad-

dles for pillows and slept outdoors upon our blankets with nothing but the astral skies for cover, except during torrents, when we would scamper to the little adobe until the storm was over. Though grateful we were for the temporary shelter the shanty afforded, we would emerge immediately when the rain ceased, for it possessed none of those superfluous adjuncts to civilization, such as windows, doors, nor even a floor, excepting that of old terra firma; so the little hovel could hardly be called a luxurious retreat.

These little semi-subterranean huts hollowed into the walls of a canyon, or at the rise of a hill, are known to the plainsmen as "dugouts". The entrance to this miniature mansion, however, was covered with a genuine Navajo Indian blanket that served it as a door. If this blanket had been sold in Chicago or New York it would have brought a price many times the value of the shanty with all of its sumptuous contents plus the couple of antelope skins that were tacked upon the outer wall to dry. If the real value of that blanket had been known, this story might have been written with apologetical redress for some of the "more enterprising" boys on the ranch.

During my stay here I made another study of wild animals and of the strange traits coincident with their nature after assembling a "boy's collection" comprising a fawn antelope, some prairie-dogs, horned frogs, a rattlesnake and a family of six young star-black skunks with their mother. I was out a short distance from our camp about sunset to catch some young jack-rabbits when I came upon the family of skunks while the mother was teaching them to capture their own prey, preparatory to weaning them. I was familiar with the little

white striped polecats, of fetid fame, but I had never before seen nor heard of the large bushy tailed, star-black skunks; nevertheless, I hesitated to approach the inoffensive looking family, for I suspected danger of it being an associated species of the odoriferous polecat; but this possibility was so effectively disguised in their solid black coats and waving bushy tails, that as my



The adobe camp was built beneath a precipice in the sidewalls of the canyon.

eagerness to capture strange wild animals spurred me on to disastrous bravery, I rushed upon them in proud boyish expectancy of a prize catch. But the hovering mother, apparently anticipating my attempt to kidnap some of her youngsters, stood guard over her family with stern vigilance.

Madam Skunk's maternal instinct to protect her children developed before I awakened to a full realiza-

tion of what was about to transpire. That the old lady's defensive artillery was in truly commendable working order is evidenced in the memento with which I was presented—pew!—the air became redolent from the bombardment that immediately followed, but that did not stop me from trailing them (at a perfectly respectful distance) until they sought seclusion in their den under a slab of rock, only a short distance from our camp.

Upon returning about dark, I was surprised to learn from the boys (all of whom were many years my seniors) that the news of the odoriferous entanglement had been broadcast to them upon the waves of the balmy breeze long before I reached the camp to tell them about it—radio was unnecessary. The blue flannel shirt and overalls, plus a red bandanna handkerchief which I was wearing at the time to keep the torrid sun from baking my neck, comprising my entire wardrobe, it is needless to say that I was a miserable exile from the comforts of the camp for a few days until the rays of the sun, assisted by the action of the wind, purified the fabrics. My future heedless attacks upon skunks were also “purified” by the never-to-be-forgotten incident itself; the aroma in my nostrils' fancy still lingers.

In the meantime, I was busily engaged building a small enclosure with slabs of stone and gravel mortar in which to retain the skunks that were captured later at their den by means of a trap improvised from an old canned fruit box which I placed directly over the entrance to the nest.

In fond reminiscence of that odoriferous incident, let us not forget what General Sherman said of war.

A week or so later I mounted my little Mexican pony and rode down the course of the canyon for a considerable distance to where there was a spring of cold running water in the bed of it. Arriving at this little fountain of "Adam's Own Ale," I dismounted and descended the steep stony cliffs for a drink of the water which I scooped up and drank from the concaved broad brim



I threw the rock with such force that it brought the animal to earth in a daze.

of my Mexican sombrero. As I arose to retrace my steps to where my pony stood, I found myself facing a Mexican lion lying only a few yards away in the lower forks of a great cottonwood tree that towered from the bed of the canyon, the level of which was many feet below the spring.

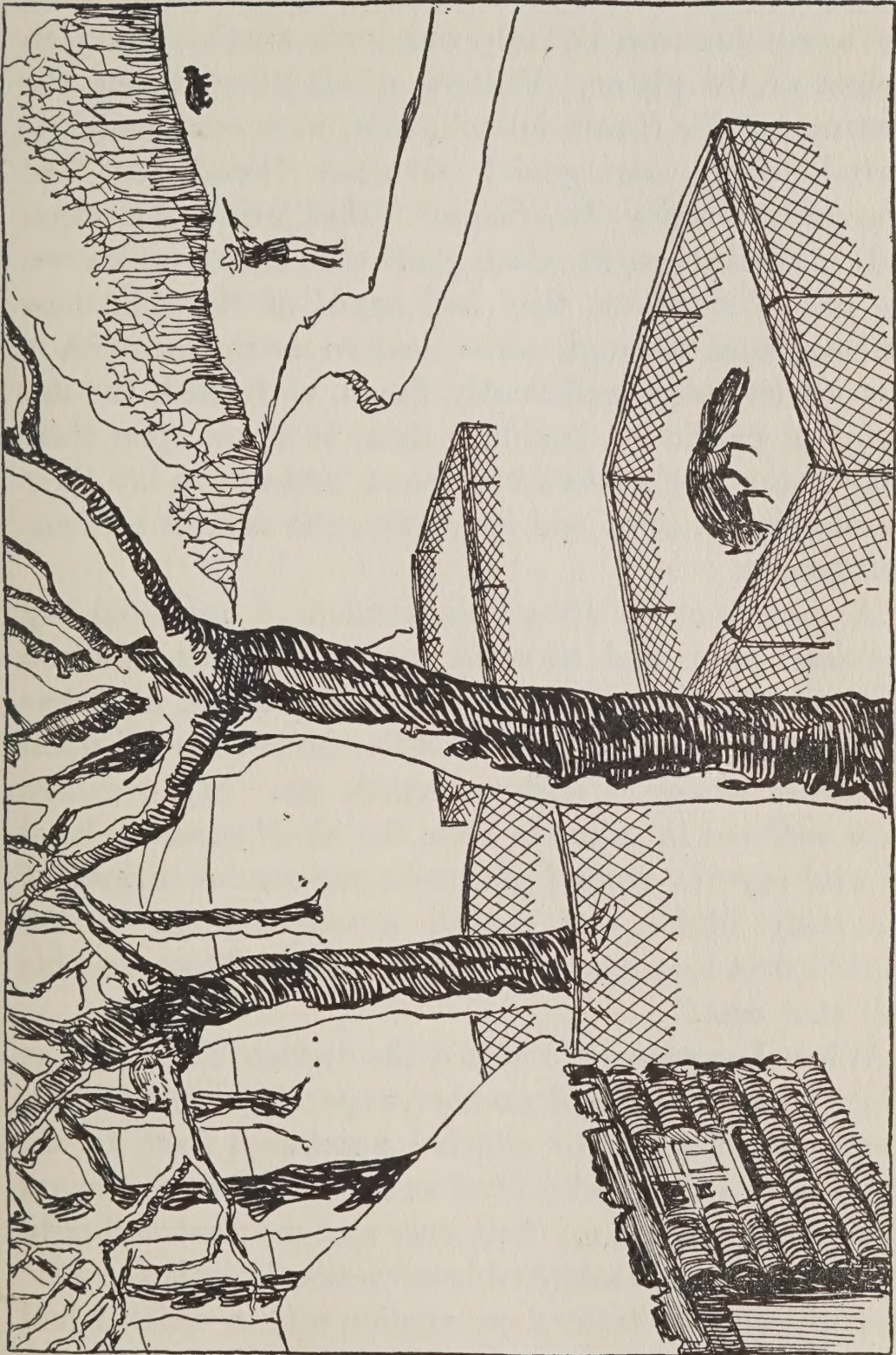
The chambers of my old fashioned Colt's revolver having been recently emptied at coyotes, I readily recalled my ability to throw a rock with a remarkable degree of accuracy and with terrific force, as almost every husky boy can do, the knack of which I had acquired through ball-pitching at the daily school yard games "back home."

The bed and walls of the canyon being lined with rocks, I found one of the desired size lying at my feet, and threw it, hitting the animal squarely between the eyes; its skull crushed against the large limb over which it was peering with such stunning force that the beast immediately fell to earth, when it was struck on the head by a larger rock that killed it almost instantly. Modestly do I accredit myself with the distinction of being, I believe, the only living person who can lay claim to having killed a Mexican lion with a rock.

Whether my action was one of distinction, or of inhumanity, will be left to a jury of my readers, but in self-defense I wish to explain emphatically to that jury that had I been further advanced in the school of experience, with a fuller understanding of the ferocity of a Mexican lion when it is wounded, the animal would be enjoying both life and liberty today, so far as I am concerned.

When the men at the ranch camp explained my narrow escape from being clawed to shreds by the animal, coincident with the lucky hit with the rock, which was a "one-in-a-hundred" strike, my heavy crop of hair so stood on my head that I believe the scare I received then is largely responsible for my lack of hair now.

The animal's pelt afterwards served as a rug to sit



Another experience with wild animals, while on a ranch in the Indian Territory.

upon at meal time, for chairs and tables were then extravagant luxuries entirely unknown on the round-up ranges of the plains. Pillows, which were also on the waiting list for future introduction, were commonly referred to by our genial Mexican friends as "ese grandisemo estilo Americano" (that great American fad). While these Mexican gentlemen had never known the use of a pillow, they had heard of the ridiculous extravagance through some eastern aristocrat with a flow of language sufficiently fluent to furnish the description explicitly, enabling them to draw upon their imagination for a picture of it, or perhaps to lay their irksome heads upon one in phantasmal dreams of tranquil repose.

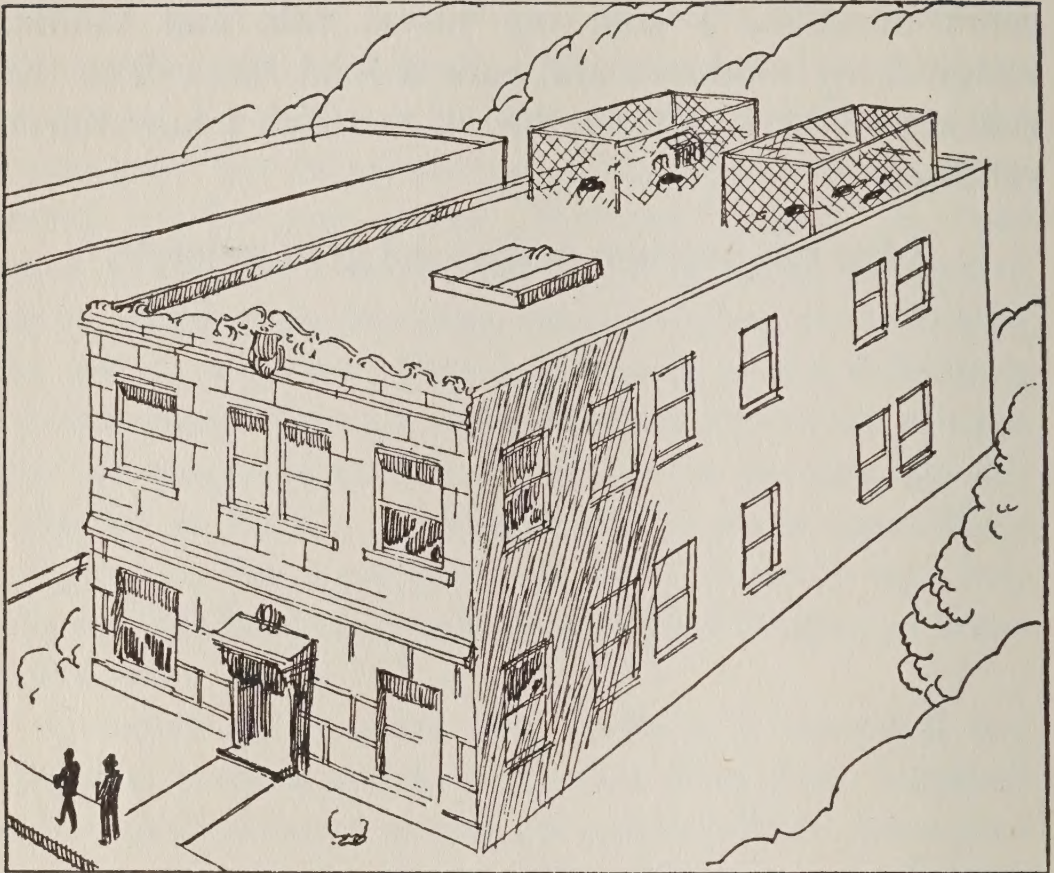
A month or so after this incident I mounted my Mexican pony and traveled more than four hundred miles northeastward across the semi-civilized, houseless prairies, sleeping upon my saddle-blanket spread upon the grass wherever night overtook me. My evenings were suffered in solitude while the blood-curdling howl of wild coyotes around me broke the sombre silence of the stilly night, and played accompaniment to the world's first movie actor—the Man in the Moon and his "all star cast."

When I eventually reached the Indian Territory, as winter came on, I had another experience with minks, coons, and one red fox which I purchased from an old Chickasaw Indian who lived nearby. While I was on this ranch, I killed my first deer and my first and only bear with my old fashioned lever-action Winchester rifle that was an ever trusted companion and in which I had implicit faith in my unerring aim.

Immediately following this experience, which was of

short duration, I sold my horse, rifle and saddle, resigned my sombrero and bade a fond farewell to the ranches of the Great Southwest, to which I have never returned.

Adios mis queridos amigos del gran sudoeste.



A few muskrats upon the gravel roof of the house in which I lived in St. Louis, Missouri.

The illustration above shows how I retained muskrats upon the gravel roof of the residence in which I lived in the city of St. Louis, where the animals had no access to water other than for drinking, with no apparent ill effect on their furs, nor on their physical condition. Upon moving to Chicago this ranch upon the roof was summarily discontinued.

On page 15 is a reproduction of an experimental ranch which I conducted in the Ozark Mountains, on the Meramec River, only a short distance from the city of St. Louis, in an extremely rugged, rocky locality.

The illustration on page 16 shows the cabin on a hunting lodge along the shores of Lake Huron in which I stayed while trapping fur-bearing animals for breeding purposes, and where I captured my first ermine.



A rustic log cabin in which I lived alone, in the Ozarks, near St. Louis, Mo., experimenting with fur animals and golden pheasants.



Cabin on a hunting lodge in which I camped while trapping fur-bearing animals for breeding stock, along the shores of Lake Huron.

While the orderly procedure that leads to successful fur raising is definitely embodied in subsequent pages of this book, for the benefit of persons who wish to establish an enterprise in the freedom of "The Great Outdoors," the real value of it lies purely in the amount of study put into it. The accrued data of my personal experiences and extensive research, which practically covered the North American Continent, comprise the material contributions to this work in its entirety.

EVOLUTION OF THE FUR BUSINESS

THE use of furs dates back probably as far as the beginning of the race of man. In some European countries—but yesterday, in the measure of time—only members of royalty were permitted to wear them. The fame of the ermine originated in the reign of King Edward III, who decreed it a punishable offense for any one of other than royal birth to wear the fur of this wonderfully beautiful little animal. It then became the “badge of royalty,” insignia of all that is exalted and majestic. While this restriction to royalty has long since been removed, the ermine remains the “royal fur,” to which it unquestionably owes its long standing popularity.

Eventually, valets and attendants to families of royalty were permitted to wear furs, except that of the ermine. Finally, when the ban was lifted entirely, furs became an article of commerce in general, soon reaching to all the world.

The commercial history of America begins with furs. In early days of this country prior to the discovery of gold, the beaver skin was a recognized medium of commercial exchange in lieu of cash, and a man's credit or purchasing power was reckoned on his yearly catch of that animal, which was then so plentiful that no one ever dreamed of it being trailed to the brink of extinction.

Later, pelts of fur-bearing animals generally became accepted mediums of exchange for all manner of merchandise throughout our pioneer states and territories.

Today, in different parts of the United States, furs provide the main source of sustenance for many trappers who anxiously look forward to the time when the trapping season is open so they may enter the wilds and bring out their share of the revenue which is very great to those skilled in the craft.

America supplied pelts, for nearly three hundred years, that were dressed, dyed, and manufactured into articles of wear in the European fur manufacturing centers, many of which were returned to this country for final sale to the consumer; some, perhaps, reaching the individuals who trapped the little animals that produced them. But, since our aggressive frontiersmen have hewed their way through the American forests, preliminary to the advancing strides of civilization, they have driven the little fur animals back, day by day, destroying their haunts, until they have fallen easy prey to the ever alert fur hunter and are becoming a thing of the past at such an alarming rate that a semi-domestic production of furs on the farm seems to be the alternative by which we may hope to save an appreciable part of the fur supply of America.

While it is admissibly true that furs are not essential to comfort in the more southern climates, they are commonly worn for warmth and adornment in almost all parts of the civilized world, especially by the better dressed class. However, furs are absolutely necessary to the comfort of people in the far north because there are no woven fabrics warm enough to repel the piercing cold of mid-winter, in that region.

It is not a part of the present purpose to attempt to embody in this article an extensive discourse on the principles underlying the great fur industry, other than to

say for persons having no previous occasion to give it thought, that fur garment making is the oldest trade known. Through necessity, "the mother of invention," it had its origin about the beginning of the time of man, when each person procured his own pelts from which he made his own garments by lacing them together with thongs made of similar skins.

This crude manner of making garments from the skins of animals continued for ages before the art of weaving fabrics became known. Later, those who wished to avoid the laborious task of tilling the soil and who were more skilled in the art of making attractive fur garments, entered it as a commercial in-



Furs for comfort and adornment.

dustry to meet the needs of others who could not devote their time to making their own, and with whom they exchanged furs for food products and pottery. Thus the wheels of commerce began to turn slowly but surely, advancing only as the population grew to increase the demand. Later, fur factories were established, which led to the various commercial industries of the world, in which we now struggle for supremacy.

Our pilgrim sires aboard the historic Mayflower were prompted by the tempting premium on pelts, to brave the stormy seas to a land then unknown, in their never ceasing search for the little animals that produce them. This cruise led directly to the civilization of America, and, later, to unfurling The Star Spangled Banner over the seas of the world, in the cause of The Land of the Free.

In paragraphs which follow it will be seen that only brief mention is made of the fur manufacturing business merely to outline a comprehensive idea in general of the tremendous proportions into which this gigantic business has grown in America within a relatively short time.

A complete treatise from which a full understanding of the methods used in the art of dressing, tipping, dyeing, matching and manufacturing furs may be acquired, would fill a volume. In fact, it could be accomplished only through the school of actual experience in the trade.

That branch of the business being distinctly a thing apart from fur raising, no pretense of a knowledge of it is assumed, other than to say that making articles of wear from dressed pelts is only a matter of trimming and seaming, really not requiring highly skilled mechanics, as many believe, unless it is desired to alter, or to disguise the fur, when the real art would lie in properly matching them.

Two factors seem to have contributed largely to the advanced strides recently attained in the fur manufacturing business, namely, new mechanical inventions and a wonderful degree of proficiency developed in the art of dyeing, tipping, etc., thus enabling manufacturers to produce desirable furs from pelts of most ordinary kinds which were, heretofore, considered of little or no value.

So perfect in appearance are these imitations that many who buy furs are now entirely unaware of the real name of the animal from which they came. For instance, muskrat is dyed to represent the several names under which it is sold, as, Hudson Seal, French Seal, River Mink, Brook Mink, Electric Seal, etc. The Hudson Seal is a very handsome product difficult to distinguish from the genuine Alaskan Seal. It is nearly as durable, lighter in weight, and much more pliable. Skunks are made to represent Alaskan Sable and Black Sable. Rabbits represent Coney, Sealine, Beaver Coney, Mole Coney, Nutria Coney, etc., while the pelts of our common nocturnal serenaders "tom and puss" of back fence fame, are made into very handsome articles of wear and sold under the more attractive pseudonym of "Genet Furs," whereas if they were offered under the real name, cat furs, the sale would probably lag.

Many women who are wearing the most beautiful sets of "Civet Furs" would probably suffer an injury to their pride if they were told that the pelts from which the furs were made came from the backs of odoriferous polecats. Regardless of the source of origin, *Civits* are beautiful and durable furs, contributing so much to the warmth and comfort of so many people, that the animal which produces them need not be considered any more than if "polecat" were the misnomer rather than the euphemism under which their furs are sold. The rich black fur interspersed with the snow-white stripes present a pronounced contrast that is much to be admired, yet, if offered under their real name, "polecat," many overly imaginary persons of exacting pride would readily spurn the purchase with a cynical twitch of the nose, significant of arrogance. For this, and for other rea-

sons, the various trade names under which furs are designed, and sold, have lent considerable impetus to the fur trade in general, enabling the manufacturers to utilize, pelts, and parts of pelts, to a profitable advantage, that would, otherwise, be wasted.

Prior to 1914 the greater part of the world's fur industry, especially the dressing, dyeing, tipping, and manufacturing end of it, was controlled by the European fur markets; the annual fur trade of the United States being only about \$40,000,000.00. Later, the fur trade was transferred to this country, and in the year 1919 amounted to more than \$375,000,000.00.

All branches of the business are now successfully carried on by American enterprises representing an investment, in the aggregate, of more than \$300,000,000.00, and furnishing employment to more than sixty thousand people in New York City alone, and to proportionately large numbers in other markets of America where a great volume is represented in buying and selling raw pelts that come direct from the trappers in all parts of the world.

At fur sales held in America's three great fur markets in 1920, when pelts reached the pinnacle of prices, Silver Fox skins sold for as high as \$2,000.00, Muskrats brought \$6.80, Skunks \$12.00, Minks \$75.00, and Raccoons as high as \$20.00 each. These prices were, of course, a direct result of the World War, but long before that time the continued demand for furs, paralleled with the decrease in fur-bearing animals, caused prices to advance steadily until they reached the peak in 1920. While pelts are much lower now than they were then, they are yet at a very good margin of profit, and it is reasonable to presume that the law of supply and de-

mand will never permit them again to reach the low level of pre-war prices.

The combined average sale of raw pelts in America's several fur markets usually totals about \$45,000,000.00 to \$50,000,000.00.

THE FUR SUPPLY

The high prices recently paid for pelts has encouraged rigorous trapping, with the inevitable result that the natural source of our fur supply is rapidly vanishing; consequently, the necessity of fur raising is being forced upon us to offset a further shortage in our annual fur crop from the wilds, otherwise, the selling price of fur garments would soon be so great that none but the "very rich" would be able to wear them.

Through the recent nation-wide drainage projects to reclaim swamps, marshes, and ravines, and by clearing forests, thickets, etc., to provide for the advance of civilization and to meet the acreage needs of our increasing population, man has so encroached upon the breeding grounds of fur-producing animals that they have steadily diminished, and, as a result, the premium on their pelts must advance accordingly. Many of our more valuable animals are now so scarce that the demand for their furs is met by substitution with inferior pelts which have been dyed and made up to represent them, as mentioned in the foregoing article, under the caption of "The Fur Business."

Slowly, but surely, it is being "brought home" to those who have occasion to give it thought, that if we hope to maintain even a fair part of our present fur supply, *we must raise it.*

To those conversant with these conditions, the great inroads already made on the fur supply are visualized in the commercial reports for 1919-20, that we imported into this country, for that season, \$103,772,044.00 worth of raw pelts alone; whereas, for nearly three hundred years America had been the fur trapping center of the world and had furnished the greater part of the fur supply because of its endless forests, and seemingly inexhaustible stock of fur-bearing animals.

This alone should be conclusive evidence that a domestic production of furs is at this time a commercial necessity. So world-wide is the market for that commodity, that this generation need have no fear of an over production through the entry of numbers into the business. In fact, as others turn to fur raising, that industry should flourish by commercial stimulation, as did the hog, cattle, wool, and every other industry having its origin in an established need. If there were not a large number of people already engaged in the various branches of the fur business, that great industry could not possibly maintain its present status.

TRAPPING

Trapping, as it is now carried on, is a wasteful destruction of animals before their furs are prime, but to-day, and from time immemorial, about the only means of obtaining fur animals from the wilds, out of which they are now procured, is by trapping them. The usual way to trap animals is with steel traps which snap them by the leg, frequently breaking the bone. Unless the animals are successful in wringing off the broken leg, in their frantic effort to free themselves, by lunging

with their weight from the length of the chain to which the trap is attached, they must remain in the jaws of the trap, in lingering agony, sometimes for days, until the tardy trapper retraces his steps and relieves them from their misery by a death dealing blow with his cudgel, only to find, in all probability, that because the fur is not prime, they are practically worthless; yet, the animals are destroyed, to meet no need, and the prospect of reproduction of their kind is lost. But, inasmuch as we know of no other practical means of procuring them, in the wilds, this destruction cannot be avoided unless the present method of trapping is displaced by a domestic production of furs on the farm.

If for no other than humane reasons, fur ranching should be looked upon favorably, and encouraged by every one having an appreciable idea of the untold agony and frightful torture which fur-bearing animals must undergo if we may obtain them from the wilds to secure their pelts from which our furs are made.

The seemingly inhuman methods now used by trappers in procuring furs from the wilds are apparently as barbarous as were customs of the neolithic age, yet, since they know of no other way for successfully securing the pelts of these little fur producers, *they are not to be blamed* for the brutality underlying the vocation. They are actuated purely by a commercial consideration, pursuing the long established method for securing the pelts to meet our needs, and to satisfy the demands of the commercial world.

Ermines are caught in extremely cold climates by greasing a piece of steel which they lick; the intense cold freezes the tongue to the metal where they must remain, to die in agony, unless they are successful in

tearing the tongue from the mouth, which they often do, only to die elsewhere, of starvation, and be lost, to no purpose. Thus man commercializes in barbarous cruelty to these little animals, that we may have their skins for our comfort and adornment, which, however, is necessary, unless we raise the animals on the ranch.

It is estimated that as about one-half of the trappers' yearly catch is not prime, it is of little value. This annual loss caused by destroying the animals before their furs prime is almost inestimable, to say nothing of having them writhe for days, in agony, to be destroyed finally in the same manner as those with furs of value.

Not only is the life of that particular animal taken when its fur is worthless, to meet no need, but the reproduction of its kind is lost, with a loss to the community of many times its value even if the fur had been at its best. However, the trapper cannot avoid this destruction of animals before their furs prime under prevailing conditions, because he must take all that are unfortunate enough to fall a victim to his traps. Neither should he be criticised for it, because he is operating legally under an established custom—the precedent of ages.

In fur ranching all of the foregoing is avoided, the animals being under control they are taken alive, unharmed, and only when the fur is at its best. Proper arrangements are made for killing them by the application of an anaesthetic from which they die quickly, without pain or struggle, in which is hereafter described as The Killing Box, under the caption of "Killing Fur Animals." All that are not prime are allowed to remain until they become so, because it would be unwise to destroy them at any other time; being under con-

trol they may be taken at will, without the use of snares, dead-falls, steel-traps, or mouth hooks; none of which are permitted on a fur ranch—they are not needed.

FUR RANCHING IN GENERAL

Research into antecedent generations discloses to us that every dogmatic doctrine of today is but the scientifically developed theory of yesterday. Some of these theories were conceived in the plastic minds of persons capable of thinking in terms of sound reason rather than concentrating in the rut of antiquated precedents, and lingered there for years before they evolved into practical fact rather than fancy.

The latest developments for an outdoor life, or for farm advancement, are the scientific inroads recently made upon nature's wild life in the domestic propagation of fur-bearing animals, creating a home production of furs through proved methods that are diametrically opposed to one's first mental picture of the real essentials to it.

It is the first impression with nearly everyone unfamiliar with the subject, that to raise fur-bearing animals successfully it is necessary to enclose a large area naturally adapted to the kind, or kinds, of animals that are to be raised, in which they may govern themselves in nature's own way. This attempt would incur a tremendous expense in fence construction for the ranch, in which would be created nothing more than an individual trapping field that might be somewhat more productive of the animals desired, than if the fence did not exist. The reasons why this natural range idea of the

inexperienced fails to produce the expected results, will be more clearly understood by the reader of this book as he advances in his studies on the subject which are elucidated by the illustrations accompanying each constructional essential, and by the many characteristics peculiar to the animals of which the separate articles treat.

To produce these animals, successfully, the ranch attendant must retain them under semi-control, or under complete control in some instances, for reasons that will automatically unfold themselves in the pages which follow.

Fur ranching is a business in which fur-bearing animals are raised domestically, for their furs, as one would raise a sheep for its wool, or anything else for its product, but, as this business is still in its infancy, and the essentials to it are less known than are the requisites in other branches of livestock raising, it demands closer attention to detail until the ranch attendant acquires practical knowledge of it.

While it is well known to nearly all persons who are familiar with furs, and with trapping, that the greater portion of pelts brought in from the wilds are not prime, and practically worthless, the fact is also becoming equally as well established that furs raised on ranches where the essentials are understood, are all fully prime, and of elegant superiority to any others of corresponding kinds, in spite of prophetic skepticism of the uninformed.

Confronted with these conditions it seems safe to advance an opinion that the production of a superior article will eventually present itself in a manner sufficiently enticing to prompt many of the more progres-

sive class to take up fur raising as an industry, rather than to be content with it as an undeveloped side-line, or as a hobby, as many who are successfully engaged in it are now doing. If fur raising is a success in a small way, as it is known to be, it is certain that it would be all the more successful if it were conducted on a commercial scale, with businesslike management.

Geographic location, general topography of the land, and climatic conditions largely determine the suitability for a fur ranch, yet, they may not be the decisive factors, because almost any location other than that of the southern states would be productive of luxuriant coats of furs, especially upon animals that are native to the climate in which the ranch is to be established. For instance, it would not seem feasible to attempt to raise the silver fox in Louisiana, nor the opossum in Alaska, while the mink, or the otter, would be at home in either locality where they would develop furs of normal commercial quality.

Gray lands, or a sandy surface are commonly considered the better kinds for a fur ranch, because these more readily absorb the water after rains. The clay soil retains moisture, becomes muddy, and is conducive to unclean conditions, while a limestone soil makes the furs dry, harsh, and brittle. These are some of the reasons why so many undesirable pelts come in from the wilds, yet, it is not intended to create the impression that a fur ranch could not be successful on soils of either kind.

There seems to be an opinion prevalent with people not familiar with the essentials to fur raising, that to conduct a ranch successfully it should be isolated upon an island, or be buried in the depths of some forest far away from the beaten track of travel. Such locations

would be neither necessary nor advantageous, contributing only to the inconvenience of the attendant.

Inasmuch as the term "cold weather" and the word "furs" are inseparably associated with each other, many people are misled in believing that to produce desirable furs it is necessary to establish the ranch in the snowy regions of the frozen north. It is unquestionably true that some of the finest furs do come from the colder climates, but the impression that no climate other than that of the far north would produce good furs is erroneous, and gained impetus, no doubt, from the beguiling statements of some fur salesmen (probably to effect sales) that "*These are rare specimens of furs from the depths of frozen regions of the Arctic Circle*"???. Whereas, in all probability the little animals that contributed their skins to make them were trapped just back of some cornfield within the immediate vicinity of where the furs were being offered for sale.

Those who believe that desirable furs come only from the frigid zone are destined to have a rude awakening, for it is known that many of the finer pelts come from fur ranches within the United States, and from the wilds in some districts as far south as Tennessee and Arkansas, below 35 degrees latitude, yet, it is known that some kinds of wild animals will not develop furs of superior quality in that climate; neither do some animals in the extreme north produce as fine quality furs as do some of their kindred farther south.

The central section of the United States, between 35 and 50 degrees latitude, was the world's greatest trapping lands for nearly three hundred years, until civilization drove the animals to the brink of extinction, when large numbers of them drifted farther north for

seclusion in the woodland recesses of the Canadian wilds.

Any part of the world from 35 degrees of latitude north, where freezing temperature is of frequent occurrence, excepting in arid districts, would be productive of desirable pelts upon fur-bearing animals of almost any kind, and always upon animals of some kind; longitudinal differences other than that leading into desert lands are ineffective. While the more humid district, as a rule, produces the finer fur, and the denser coat of it, there is an occasional verdant valley within an oasis between the sun-baked boundaries of desert lands that will produce desirable furs under judicious management.

The beginner in fur raising has many obstacles to overcome and various things to consider. First, he must determine which animal, or animals, are to be raised, then he should study them from every angle of information given in this book, where implicit instructions with reference to each animal are to be found, under their respective captions.

A general information on fur-bearing animals given collectively as some authorities have done, in terms figuratively rather than in fact, only leads to ultimate confusion for the beginner, from which disastrous results are likely to follow because of the lack of many little details that would be necessary to the success of his undertaking. Collective suggestions should not be offered on fur-bearing animals, other than to define their habits generally, or it may be said that a woods, thicket, rugged hillside, or any shady, secluded area, would be preferable for any member of the fur-bearing kind. Yet, it is well known that these little animals may be success-

fully raised in open fields that are entirely barren of shrubbery, or of any other appealing adjuncts common to their natural environment in the wilds.

It is well known to nearly all who are more familiar with wild animal life, that where they are raised in low lands, they produce better, and finer furs, than do their kindred inhabiting the higher altitudes, even though they are raised in close proximity to one another; due, probably, to a more moist or humid atmosphere that is generally prevalent in the lowlands. Accepting this condition as a criterion, it would be reasonable to presume that lakes, swamps, marshes, or rivers within the immediate vicinity of a fur ranch would unquestionably be a decisive factor in its favor.

Even though higher altitudes do produce coarser furs on some animals, it is not meant to create an opinion that a fur ranch must be located in the lowlands, because, unless the location is a very high and dry one, the difference in quality of furs produced would perhaps be inappreciable, for a number of instances are known where rare specimens of furs have been produced upon animals that were raised in back yards in large cities, and especially so around barns and fence corners in suburban districts where the animals were retained under conditions entirely foreign to their natural environment; offering evidence sufficient to base an opinion that it is more upon the care and food the animals receive, than their proximity to natural conditions, upon which successes depend.

Then, with these known results confronting us I can not conceive reasons why the average farmer should fail to reap handsome profits from a fur department in a small forest on his farm, where if it were stocked with

some generative member of the fur-bearing family, his cost of feeding would be nil, because he should have nothing to buy.

The requisite acreage for establishing these little fur departments would depend entirely upon the number of breeding stock he intends to retain, or it may be governed purely by the amount of non-productive land his farm contains. The space that is really necessary for an attractive production of furs is much less than the uninformed person would at first imagine; all of which may be determined by reference to the size of pens needed for the different kinds of animals, as given under their respective captions.

By determining the number of pens the available space will permit, it is an easy matter to estimate the yearly animal production, which, if multiplied by the average selling price of pelts, the expected annual gross income will be determined, plus an additional profit from the many animals that would be sold for foundation stock to others wishing to enter the business. The extra profits from the sale of breeders should be sufficient to more than pay for the entire cost of operating, leaving the income from the sale price of furs as net profit.

Where the fur-bearing animals raised each year are sold for breeding stock—which would likely be nearly all of them—the keeper could figure on the cost of food being but little more than that required for the mother animals, because the young would be sold in the early spring, to be shipped as soon as they are weaned, during which time they consume very little food substance other than the mothers' milk.

Many attempts have been made at fur raising within

recent years, mostly in an experimental way, none having entered it on a scale of commercial magnitude in the United States. These attempts have met with varied results; some meeting with success far beyond their expectations, while others have met with dismal failures, due largely to the valuable time wasted through inexperience with the essentials at breeding time, which is by far the greatest loss sustained in the undertaking. For instance, if an attendant fails to follow the proper procedure during the breeding season his production for that year would be hopelessly lost; then he must wait until the next spring season before he can correct his blunder. Then, if he is not certain of the reasons why he blundered, he would likely face the same disastrous results again and resign in despair, with the discouraging information for his friends that fur raising is a failure.

Well, it is true that failures can be met with in fur raising, as they might be in any other business; but, with proper attention and a little common judgment applied to it, there is no perceptible reason why anyone should fail to meet with satisfactory results in the undertaking, because nature will surely reproduce its kind; then if a way is found to bring that production to maturity, through the essentials to it, success is reasonably certain. Yet we must not disregard the underlying principles of good business management, for this is a determining factor in the success of any undertaking.

The failures that may be met with in fur raising are by no means indicative of the business standing upon a footing that is fundamentally unsound, for some people will fail at anything, under any conditions.

According to an article recently published in a well

known magazine, a silver fox ranch was established in 1914 with only two pairs of foxes. At the expiration of five years the valuation of this ranch grew from its humble beginning to a total worth of more than \$200,000.00. This was not the result of an abnormal production, nor was it a miracle; it was merely the natural result of compound increase from the breeding nucleus, from which it is obvious that anyone may start in the fur-raising business on a scale as small as he sees fit, or as large as his finances will permit, with reasonable assurance of the safety of the investment; but in either event it will be necessary to await nature's production before a profit can be expected, when the returns can be measured only by the scale upon which the business is entered; the breeding nucleus will furnish a concrete base, on the face of it, upon which to estimate expected earnings within a given period that perhaps no other business offers.

Should finances be limited to the necessity, a fur ranch may be started with only one pair of the animals that are chosen to be raised. If these are permitted to increase, compounding each season, a nucleus will soon be built that would enable one to step out in a business "all his own" surpassing perhaps anything else on a proportionate investment, because this is a business that grows without the effort or expense of building business, nor of establishing a clientele.

The compilation in the "Table of Animal Increase" will assist in determining reasonable expectations within a specified time from the number of breeding stock with which the start is made.

Fox raising, as an industry, began on Prince Edward Island about twenty years ago. The knockers, the

skeptical, and people who never think in terms of their own, "hooted" at the idea of anyone venturing upon a project so theoretical. But, very much to the chagrin of those who are always afraid that someone other than themselves will be successful in a new attempt, the ones who pioneered in the business with a firm determination to make a go of it, are now reposing on "velvet couches in marbled halls" while the skeptical hooters are still tilling the soil.

Of course, there were some adventurers who entered the business half heartedly and devoid of the executive ability to carry out their own minds' convictions, who soon fell at the rebounding echo of pessimistic incredulity of the knockers.

Mr. K. Lamity Howler now says that no more fortunes can be made in the business because, heretofore, they were made on the sale of breeding stock. That the people will all soon be supplied with breeders and the fox business will founder, or adjust itself to no other than a fur sale basis.

Well, it is now twenty years since the fox business began, and it is farther from a fur-basis now than it has ever been.

The demand for fur-bearing breeders will never be fulfilled any more than it will be for hogs, cattle, dogs, or chickens, which has grown persistently for ages, and is still growing. By the same line of reasoning we might as well contend that lumbermen will be forced out of business because the people will soon be supplied with houses.

It is within the boundaries of sound reasoning to believe that the sale of breeding stock will ultimately resolve itself to the "survival of the fittest," when those

demanding quality breeders will beat a pathway to the ranches of the ones who produce them—the price is no barrier.

It seems safe to predict that the one who produces a superior strain of minks, muskrats, or martens, will have a gold mine at his feet, because the supply of these animals is now so short that the demand can never be met.

Fur raising today presents such promising opportunities to people in all vocations who wish to live a life of commercial freedom in "The Great Outdoors" and in a business sufficiently remunerative to enable them to live it, that he who fetters time by the forelock should reap a rich reward in his receipts from the sale of foundation stock to the many hundreds of ranches that will spring up in all vicinities productive of furs, as fast as others "blaze the trail" to its possibilities.

Those who meet with success in fur raising may rightfully boast of their achievements, while the unsuccessful will have no others but themselves upon whom to place the blame, for it is purely upon their own capability, or the lack of it, that success or failures depend.

The ranch production of furs is as yet scarcely begun, and its feasibility is unknown to the majority of the people, but that time is not far distant when the domestic propagation of fur-bearing animals will develop into the most valuable addenda to the farms of America. Or, it is more likely to develop into an industry of its own, as far apart from farming as is cattle raising on the western prairies; especially so in the northern tier of states.

To reach the pinnacle of profits in the fur-raising business, enough rabbits should be raised to furnish the

meat for the entire ranch, for they are the natural food of all carnivorous animals in the wilds. The pelts of the rabbits produced should sell for a sum more than sufficient to pay for the cost of raising them; the remaining flesh would then represent a free meat supply for all the fur-bearing animals. Furthermore, all fine specimens of rabbits bring fancy prices when sold for breeding stock, the demand for some breeds is greater than the supply and growing rapidly.

This book is not written for the purpose of presenting to its readers the recipe for a "get-rich-quick" business, nor is it intended that it should be instrumental in influencing people who are not suited to a life in the open to engage in fur raising. Neither is it written as a road map of the short run to riches without the fun of working for it. It is the purpose, however, to make known in the most concise manner the essentials to success for those who wish to engage in the domestic propagation of fur-bearing animals as a commercial enterprise; in which the field of opportunity is limited only to the capability of those who enter it.

Fur raising is not generated by the dominating power of capital, neither is it cramped by competition, nor will it be for many generations, because the fur supply is now so short of the demand that if thousands were to enter the business today, it would require many years of domestic propagation to replenish even an appreciable part of it.

It is not meant that the attendant to a fur ranch must adhere implicitly to these instructions to meet with success in the fur-raising business, for this volume is only one in which the underlying principles of successful fur raising are made clear, into which the attend-

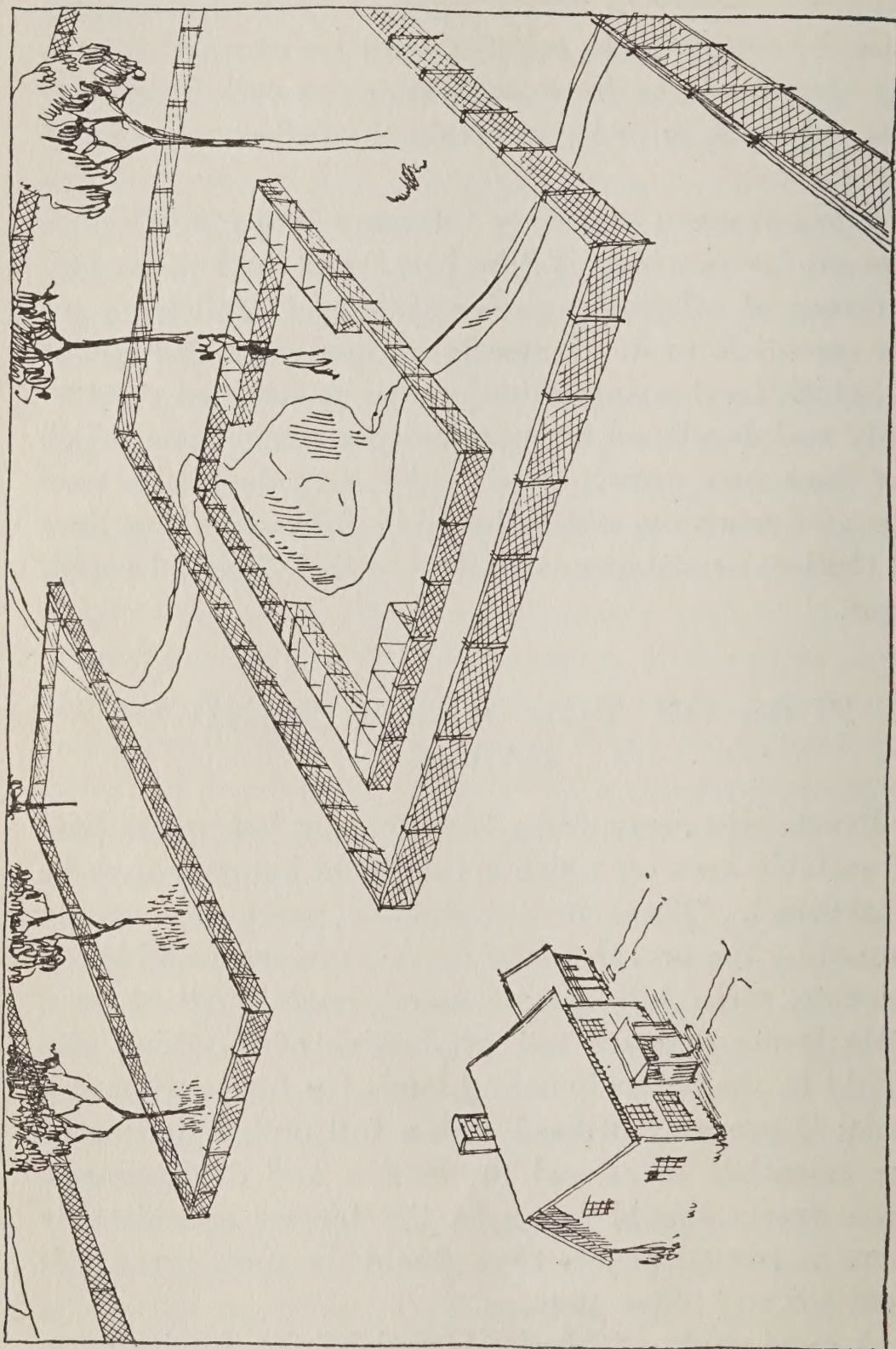
ant's own power of forethought and sound reasoning must be engrossed to coincide with his own conditions. He should add to these suggestions as each individual case demands in order to attain the fullest measure of success.

I do not mean to convey inference that my information on fur ranching is "the best," nor do I make any pretense of offering superior systems of following up the essentials to it. I merely outline ways and means by which fur-bearing animals may be retained successfully and developed to superior specimens, upon which the finer furs grow. The reader may devise his own plans of ranching, which should be followed along lines of the least resistance consistent with individual conditions.

FURS ON THE WASTE LAND OF FARMS

Practically every farm has more or less waste land of suitable area on which a profitable industry may be established. These non-productive parts are usually caused by the prevalence of creeks, ravines, small lakes, thickets, rocky hillsides, or marsh lands. All of these little tracts that are not productive of anything else would be the better breeding lands for fur-bearing animals; if properly utilized with a full understanding of the essentials to animal production and development, these tracts should bring to the farmer considerably more in annual profits than would the same acreage if used for any other purpose.

A close study of Muskrats and Minks, for instance, will reveal the almost unbelievable possibilities on a few



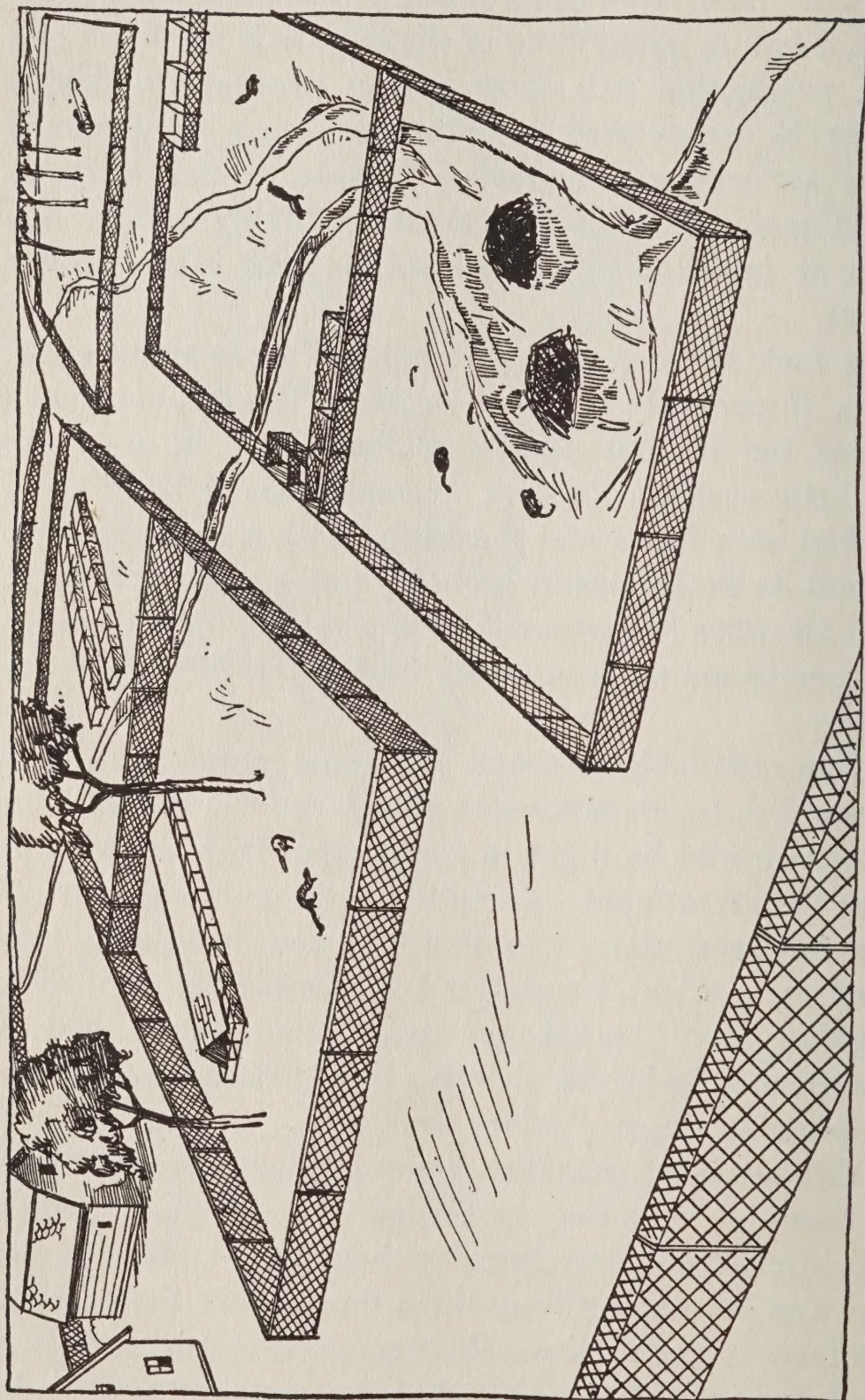
A profitable fur ranch on the waste lands of a farm.

acres of marsh land, small stream, or shallow lake. Likewise, a full understanding of the essentials to Skunk and Fox production will show how a profitable industry might be established in a small clump of trees or upon an otherwise worthless hillside, while Raccoons and Opossums could be raised profitably around the barn or in thicketed fence corners and other similar places.

In fact, there is enough available space upon every farm, if properly utilized, to make it pay more than double the amount usually realized from it, and with but little cost and labor. A small lake or large pond stocked with fishes and muskrats, with a minkery built around its banks, would probably pay a great deal more than all other departments of the farm combined, with no corresponding loss in its usefulness for stock watering.

Unquestionably it would cost some money and labor to establish fur departments on a farm, but the incident expense would be slight in comparison with the returns from the investment. In spite of the possibilities it offers, however, many people are extremely reluctant to enter any project, no matter how promising, until their neighbor has "blazed the trail" and established a precedent in their own vicinity; they usually sleep under the popular slogan "safety first."

Old worn-out farms that do not produce enough to pay the taxes on them may be turned into extremely profitable, interesting enterprises by those more learned in the lore, and be made to pay them much more than would rich farms of many times their acreage, requiring only a fractional part of the labor that is necessary to cultivate the land.



An old worn out and otherwise worthless farm transformed into a profitable fur ranch.

From the accompanying illustration a fair idea may be formed of how an old worn-out farm would look if it were converted into a practical fur ranch, with its component parts complete.

HABITAT AND FUR EFFECT

It is an apparent fact that all fur-bearing animals inhabiting the higher altitudes are of greater size than those of the same specie living in the lowlands, yet, the ones that live in the lowlands invariably have softer, glossier, and more dense coats of fur than do those of corresponding kinds living in the highlands.

Fur-bearing animals living in the immediate vicinity of the seashore have relatively dense coats that are coarse, or harsh, when compared with animals of corresponding kinds living inland along rivers, lakes, marshes or swamps.

The harshness of the sea-coast animal's fur is probably due to its exposure to the salt water winds, while those of the highlands are probably affected, unfavorably, by absence of the humidity or moisture in the atmosphere, which is more prevalent in the lowlands.

RANCH RAISED FURS SUPERIOR TO THE WILD

Everything was wild in the beginning (man is no exception). Dogs, horses, cattle, sheep, hogs, etc., were all brought in from the wilds and lifted to the present state of perfection by the care of mankind, as was everything else. When anything depreciates in its course of development, whether in captivity, or otherwise, there

is a reason for it; the ingenuity of man, if properly informed, will surely find that reason, enabling him to overcome the obstacle of hindrance.

It is firmly contended by many, who are less conversant with recent results, that animals raised on ranches do not develop furs equal in quality to that of their kindred in the wilds. Then by virtue of the same line of reasoning we might as well strive to support an unsound opinion that homeless hogs, dogs, horses, cats or cows would present more attractive specimens than do others of their kind under the care of man.

That there is innate relativity between man and beast, or that man himself is possibly the cultivated evolution of the upper animal kingdom is manifest in the life of the lowly, in the social realm of the denizens of our underworld, through whose veins the wild animal treachery is incessantly trickling. Their atrocious crimes are prompted by the same reasons, and for the same purposes that wild animals kill their own kind, which will be unfolded to observing students of this book, as they study the characteristics peculiar to both, and link them with the striking similarity of motives for which the deeds were actuated.

It is true that occasionally a pelt from the wilds will be superior to a pelt from the ranch, in some instances, as would be the case with anything else. But, because of this "occasional exception" many people are ever prone to defend the contention that ranch raised furs are inferior to furs from the wilds.

Doubtless these skeptics are actuated by a delusion, because it is certain that pelts from the wilds have a much greater percentage of undesirables among them than do pelts from the ranches where essentials to de-

veloping them are thoroughly understood. Yet, it is true that a neglectful ranchman can ruin all of his furs through inattention to the requisites for superior production.

Decisive steps should be taken to discourage illegitimate operations along the trap line, and to conserve the natural resources that are being ruthlessly destroyed because of too early, or too late trapping. This can be accomplished through organized refusal of the fur trade to buy pelts that have been trapped at the wrong season.

Trapping in the early spring is criminally resultant of two evils. One is in destroying the animals when their furs are not prime; the other is in preventing the reproduction of their kind through that destruction. It is known that these valueless pelts represent fully fifty per cent of the trappers' annual catch; yet, in face of this fact, many people (who never think, but think they do) are ever ready to condemn the entire fur raising industry simply because the poorly furred pelt of some animal that had been raised in a box, or as a pet, without sufficient air and exercise to develop it, found its way into the market.

I recently visited a raw fur buyer in Colorado who informed me that he would not buy a ranch-raised pelt of any kind, at any price, because of the inferior quality of the fur. During the course of the conversation, however, it developed that he never had seen a ranch-raised pelt; consequently his prejudice was unfounded. On another occasion a traveling fur buyer, whom I met in Monroe, Michigan, stated positively that he would not buy ranch-raised muskrat pelts at any price because their furs all "mat-up" in disarranged entanglements, rendering them worthless. This individual also finally

admitted that he had never seen a ranch-raised muskrat, nor the pelt of it.

I have retained muskrats in cages, and in enclosures where water was available only for drinking, and never have any undesirable conditions developed, neither have I heard of any, from others, with similar experiences.

Thousands of animals in the wilds, as well as those on ranches, ruin their furs by rubbing off the glossy guard hairs against rough entrances to their burrows, or against rough bark on logs, or the rough side of rock slabs under which they dig their dens.

Local firms for many years paid fox raisers of this country only about one-half the real value of their furs because of the general belief that ranch-raised furs were considerably less valuable than those from the wilds. Recent comparisons, however, have proved that the finer fox furs come from the ranches, and these furs now bring higher prices than ever were procured for similar kinds from the wilds.

If animals in the wilds are fortunate enough to find warm, dry, dens, and secure plenty of food, they will be healthy, robust specimens, developing coats of fur that would bring top prices in any market; but few of them find such winter quarters, and failing to procure enough food to properly sustain them, many are driven by hunger to the barn, or hen-house, where they are easily trapped. Rarely do these animals have a really prime coat of fur, because of insufficient nourishment to develop it. Neither do animals that make their dens in clay, or in limestone soils have the finer furs, those living among limestones having the most inferior.

Thousands of animals die each season from exposure to drafts, as in hollow logs, or in hollow trees, or because

of cold, damp dens in which they contract pneumonia. Also great numbers that are unable to put on enough flesh, or fat, to nourish them through long periods of snow and cold, die of starvation in their dens during the winter.

While a provision of nature or animal intuition forewarns them of approaching elements, it does not assist them in securing a timely food supply; if they survive, their vitality is at a low ebb, and they produce dull, poor, unsightly furs.

To raise good, rich, glossy furs, it is necessary to have well nourished, healthy animals; to that end the same adequate provision must be made for their food, and care, as is necessary for hogs, cattle, dogs, horses, etc.

Some skunks raised in captivity have produced inferior furs, and the animals themselves were poor specimens; while, on the other hand, wonderful specimens have been produced on the ranch bearing furs superior to anything yet brought in from the wilds—purely the result of care, a reasonable amount of forethought and an earnest determination to succeed in the undertaking.

In the case of two farmers on adjoining land, the corn crop of one may be a failure while the other will raise the finest crop in the neighborhood—simply the result of care.

Many who are doubtful of the possibilities of a domestic production of furs seem unable to give explanatory reasons for it. It is evident from expressions gathered from many of them relative to wild fur-bearing animals that their skepticism had its origin in imaginary minds, for it is plainly to be seen that they know noth-

ing of these animals, nor of the essentials to their production. Most of them having never seen a wild fur-bearing animal except where they had the exciting pleasure of corralling it in its cage in some zoological garden where its fur could not develop because of the lack of sufficient exercise to permit of it.

PROCURING THE BREEDING STOCK

The beginner should not attempt to trap his own breeding stock unless he can secure young animals in the early spring; those that have grown up in the wilds, having the fear of man trained into them by others of their kind naturally would be nervous, restless, and forever distrustful of their keeper; practically wearing themselves out in their continual efforts to escape to the environment of their inheritance. They probably would not breed for a couple of seasons, and have been known to destroy their own young, even under proper preventive measures on the part of the attendant.

All breeding stock should be procured from an established ranch, where they and their parents were born in captivity. Thus the attendant avoids many obstacles that would otherwise confront him in the fur-raising business. He would meet with greater success because of animals that do not fear him, that would breed normally in captivity, and would be far more attentive to their young ones.

The price the ranchman must pay for *ranch-raised breeders* might seem excessive, but if he attempts to procure his own animals out of the wilds, he will find that the cost would have been much less had he bought them outright from some reliable, established ranch, paying

the price, and obtaining *ranch-raised, domesticated animals* that are not nervous or excitable at the approach of the attendant, which means so much toward the success of the undertaking.

If the prospective ranchman prefers to procure his breeding stock from the wilds, his needs would be supplied quickly by inserting a small advertisement (specifying the kinds of animals wanted) in each of the several magazines devoted to the interest of trappers, hunters, and sportsmen. These advertisements are comparatively inexpensive and reach hundreds of outdoors people, farmer boys, etc., who would be only too glad to supply the animals "alive" for a price fairly in excess of the pelt value. Also, many people who have the various animals for sale, may be located by consulting the want columns of these publications; there are many trappers and boys who make special effort to trap animals "alive" for sale to those who want breeding stock, and this practice is now growing rapidly because of the increasing demand for them.

A practical trapper could, no doubt, trap enough animals to meet his requirements for foundation stock; but if you are not a trapper your experience would probably terminate in a futile attempt, howsoever interesting it might prove to be.

The author of this book will gladly advise his readers of the address of ranchmen having breeders for sale when stamp is enclosed for the reply. Always state the kind of animals wanted.

Beware of animal brokers, or advertisers who do not raise their own animals, but buy and sell, simply to realize a profit. Buy from an established ranch that has a good reputation. The manager of such a ranch will

give you helpful and valuable advice upon many things that will help you to success. The broker has only theoretical suggestions to offer that are likely to prove disastrous.

THE BACK YARD RANCH

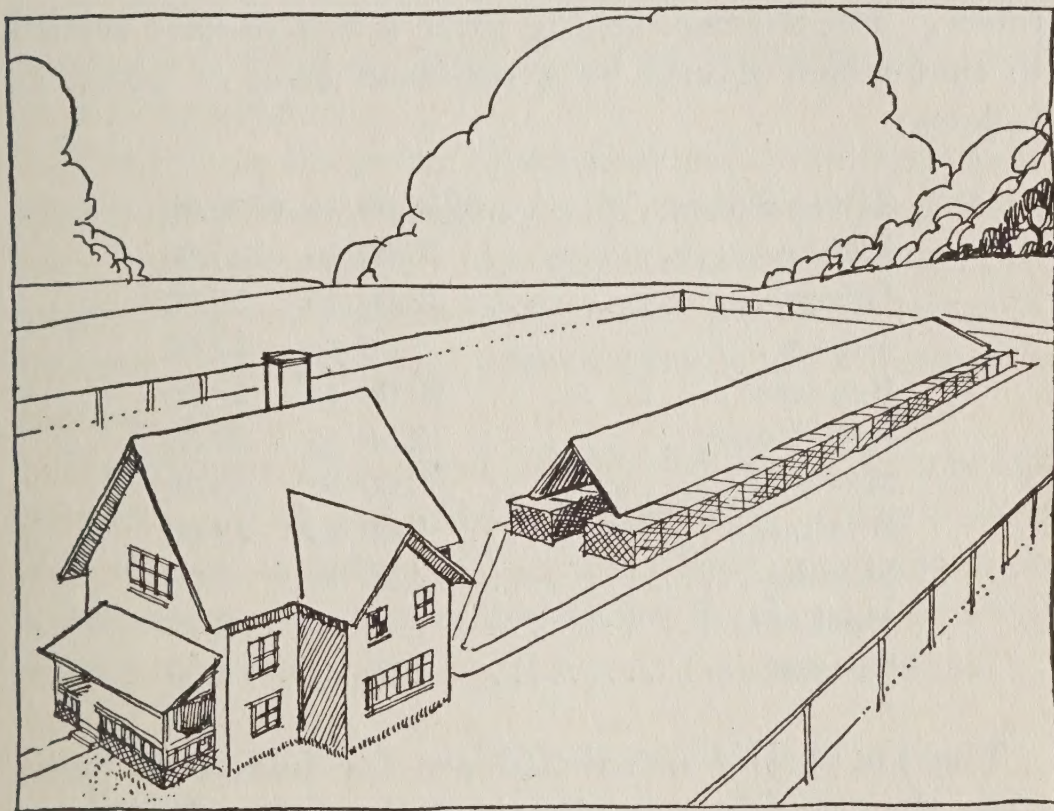
A Profitable Home Industry

There is nothing before the American people today of more importance than a home production that will offset the living cost without interfering with other obligations. This is indeed a problem, but it can be solved where the effort is earnestly made. Apparently, the most feasible plan would be to find something that will "produce" at home. To do this, it seems that it would be necessary to find something that "grows." Then, there would be a production furnished by nature, with no raw material to buy, no mechanics to hire, no clientele to establish.

This is offered in the production of furs in the back yard, or in any other available space. Anyone who could devote a few minutes' time, morning and evening, to this business, should soon realize a comfortable income far beyond all expectations.

Minks, Skunks and Raccoons in the order given seem to be the most advisable for back yard production, because they may be raised successfully in large numbers in extremely crowded quarters, apparently none the worse for the congestion. If in a city, or in an incorporated town, the mink most assuredly offers the greatest possibilities for profits, though the coon is more appealing because of its admirable antics, playful nature and docility.

In establishing a home production of furs, enough chinchilla, or black rabbits may be raised in the coal shed, basement, or garage to furnish the entire meat supply for all other animals, and for table use as well. The pelts of the rabbits should sell for more than the



A backyard ranch, in the city.

cost of raising them; in this case there would be no cost for fur production.

Enough Minks can be raised in a good sized garage, barn, or basement, or in the open back yard space to support a large family comfortably. See "Table of Animal Increase," "Selling Price of Pelts" and "Selling Price of Live Animals."

THE SELLING PRICE OF PELTS

Since there is no fixed price for pelts, no positive figures can be given; yet raw furs are, and always will be, at a price sufficient to encourage a domestic production that should prove extremely profitable to the raiser. The average selling price seems to have settled to that which should be a standard level of about as follows:

Silver Foxes	\$250.00 to	\$500.00
Fishers	75.00 to	125.00
Otters	35.00 to	50.00
Minks	7.50 to	12.50
Beavers	20.00 to	30.00
Red Foxes	12.50 to	20.00
Martens	35.00 to	50.00
Raccoons	7.00 to	12.00
Skunks	4.50 to	7.00
Muskrats	1.75 to	2.75
Opossums	1.25 to	2.25

The low prices mentioned are for immature pelts, while the top prices are for the full prime. As the fur raiser has his animals under control at all times, enabling him to take them at will, there should be no excuse for his offering the pelts at a time other than when they are at their best, enabling him to receive the top price for his entire production.

SELLING PRICES OF THE LIVE ANIMALS

There is no fixed price for live fur-bearing animals any more than there is for other kinds of live stock, the

person who produces the “*superior*” rather than the average animals, will invariably be the one who receives the greater price for them, as in the case of hogs, cattle, dogs, chickens, or horses.

The breeding stock is easily disposed of by inserting small advertisements in magazines and other publications devoted to outdoors interests. These advertisements go directly to many of the interested people, and are not expensive.

Heretofore, the prices demanded and received by persons raising fur-bearing animals for foundation stock have been very high. As this industry continues to forge ahead it is reasonably sure that prices for superior specimens will go higher, and continue to do so for many years to come.

The figures mentioned in the following tabulation are not based on the greatest prices these animals have been known to bring. They are about what seems to be the average of prices demanded by the majority of dealers offering superior specimens for propagation.

Silver Foxes	\$2,000.00 to	\$3,500.00	a pair
Fishers	500.00 to	1,000.00	“
Otters	250.00 to	500.00	“
Minks	50.00 to	150.00	“
Beavers	75.00 to	100.00	“
Martens	350.00 to	750.00	“
Red Foxes	35.00 to	45.00	“
Raccoons	25.00 to	40.00	“
Skunks	25.00 to	35.00	“
Muskrats	15.00 to	25.00	“
Opossums	10.00 to	15.00	“

Many of these animals have brought much more than the top price mentioned, while some, of course, have

brought less than the low price, depending entirely upon the specimens offered. Poor breeding stock must be sold at a price—superior specimens sell themselves and command a price.

RELATIVE DURABILITY OF FURS

The relative wearing quality of different furs as determined by the fur trade, appears in the following list according to the order of their respective durability:

Otter	Opossum
Beaver	Stone Marten, (Austral- ian Opossum)
Fisher	Kolinsky (an European Weasel)
Mink	Ermine (Arctic Weasel)
Skunk	Squirrel
Raccoon	Jap Mink (a Weasel of Japan)
Marten	Coney (Rabbit)
Muskrat	
Stone Marten (real)	
Fox	

But little attention is given here to animals other than the kinds considered advisable to attempt to raise in climates similar to that of northern United States. However the Otter, Fisher, Marten and Beaver might be profitably raised when we arrive at a fuller understanding of their requirements. For reasons mentioned in the separate articles on some of these animals it does not seem quite feasible to attempt the costly preparations necessary to that end, after due consideration is given to their ratio of increase and to the cost of maintenance in the interim, with the possible exception of the Otter in combination with others that would provide the food supply with their flesh. A colder, snowy climate would be essential to successful Fisher or Marten production.

TABLE OF ANIMAL INCREASE

	MUSKRAT	SKUNK	RACCOON	MINK	FOX	RABBIT	OPOSSUM
Normal yearly increase	4 to 7 litters 6 to 14 each	1 litter 6 to 12 each	1 litter 5 to 7 each	1 litter 4 to 7 each	1 litter 1 to 9 each	4 to 7 litters 5 to 12 each	1 litter 5 to 15 each
Basis used in figuring increase	4 litters of 6 each	1 litter of 8	1 litter of 4	1 litter of 5	1 litter of 4	4 litters of 5 each	1 litter of 9
Starting with	1 pair	1 pair	1 pair	1 pair	1 pair	1 pair	1 pair
1st Year	26	10	6	7	6	22	11
2nd Year	290	58	22	27	22	192	69
3rd Year	2624	330	78	107	78	1502	452
4th Year	22990	1986	270	427	270	11377	2900

Other animals not mentioned in this compilation are estimated on the Mink basis.

Under propagation, fur-bearing animals, other than foxes, are not maintained in pairs, but in units of several females to each male. As their litters usually average about sixty per cent females and forty per cent males, it is upon that basis that the foregoing table is figured. However, all animals are usually sold in pairs to enable the raiser to dispose of his males at breeding stock prices.

The table on muskrats does not nearly enumerate the annual production, because the first two litters of early spring will bring young the following fall; this increase is not included in the compilation. Opossums will also

average more than one litter a year, all of which will breed the following spring.

Where the females are retained each season and permitted to compound, as the table shows, the fourth or fifth year would bring almost unbelievable results. The demand for their pelts can never be fully supplied.

DECIDING ON ANIMALS TO RAISE

In determining which of the different kinds of animals to raise, one should not be wholly governed by the selling price of their pelts, nor by the value of the live animals, for many other factors that enter into the problem, demand primary consideration; such as, the average yearly increase, the relative cost of maintenance, cost of enclosures, equipment, the climate necessary for their development, as well as the difference in the amount of care necessary for each kind, for some animals require considerably more attention than others.

The Silver Fox, of course, brings the greater price, but the Muskrat so offsets the price of the Fox with its enormous yearly production and its insignificant cost of maintenance, that it is a question as to which would bring the greater annual net income, especially after a season's compound increase.

The Red Fox and the Silver Fox being equal in their yearly production, as well as in the cost of preparation and maintenance, it is obvious that from the viewpoint of profit, the Silver Fox would unquestionably be the one to decide upon. As for initial outlay, the Silver Fox would, of course, require a much greater expenditure. For instance, to establish a ranch with ten pairs

of Silver Foxes, would involve a cash outlay of around \$20,000.00 or more for the animals alone, whereas, the same number of Red Foxes, if purchased for cash, would cost probably not more than \$300.00. The cost of ranch construction would be the same for one kind as for the other.

On the other hand, in stocking the ranch with Red Foxes, many of them might be caught within the immediate vicinity, reducing the initial investment to the minimum, whereas, the possibility of trapping Silver Foxes from the wilds is so very remote that any attempt on the part of the trappers to do so would be reasonably certain to terminate in dismal failure.

Silver Foxes are practically domestic animals. To get a start with them, it would be the part of wisdom to purchase them from a ranch. While there are some Silver Foxes to be found in the wilds, their blood would be contaminated with that of the Red variety, from which they are offspring, requiring several generations of selective breeding to eradicate the Red markings from subsequent litters, and at a great cost of time and money. To expedite the general progress of the undertaking—

BUY THEM! IT'S CHEAPER.

WHEN THE SELLING PRICE OF FURS IS LOW

If at some particular time the furs that the rancher is raising are at a price lower than at which he would care to sell them, he should not become discouraged and dispose of his herd. He should retain them, gaining the multiplication from the next season's increase

of those that he would have, otherwise, pelted. In the meantime the market would probably react to his gain, because, the natural supply from the wilds is now so near the brink of extinction that it surely could not do otherwise.

If for some unknown reason the market *did not* adjust itself to the satisfaction of the ranchman, he would be the winner for waiting. For instance, if he had one thousand Skunks to sell when their pelts would bring only three dollars each, he would receive only three thousands dollars for the lot. If he carried the animals over during the following season, he would reap a harvest from their increased production in the meantime.

Since they run, normally, about sixty per cent females, averaging six or seven young to each litter, he could reasonably expect his herd to increase to about four thousand six hundred skunks, by the next selling season.

Although the market price of the pelts did not advance during the season, he would now be able to receive, at three dollars each, the comfortable little sum of thirteen thousand eight hundred dollars for the lot. Since nearly all of the herds would then be from the spring litters, the cost of maintenance to pelting time would be trifling, because all young, irrespective of sex, may run with their mothers until that time, requiring no additional pens to be built.

Result—\$10,800.00 gain plus additional receipts from the sale of breeders, for only one season of patience. The money to carry them over could easily be borrowed, if necessary, on the face of the established asset, "the furs."

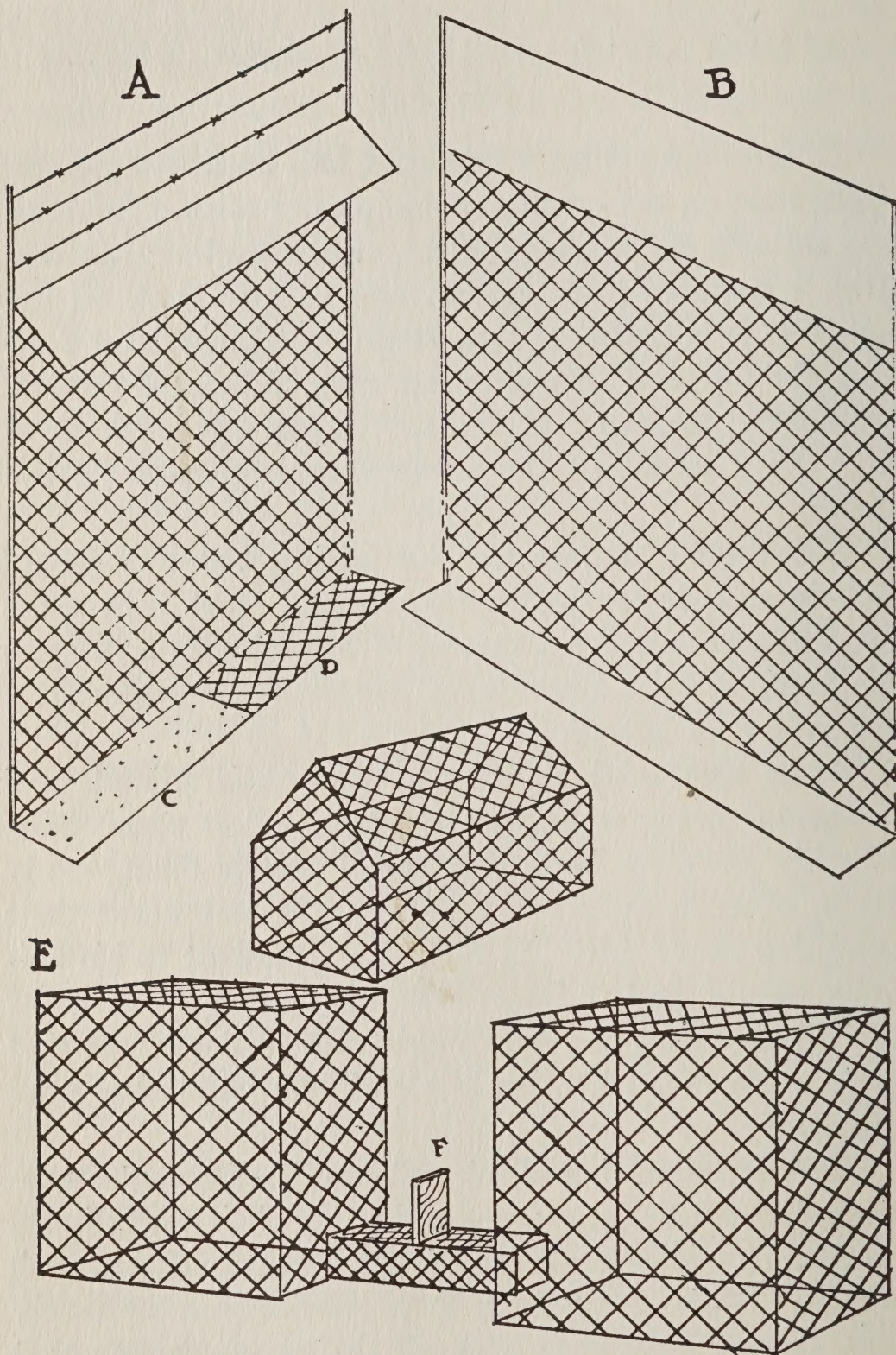
STUDY THE ANIMALS AND THEIR NEEDS

To those who consult its pages, this book will give the right start on the cardinal principles of raising fur-bearing animals under semi-control, or in complete captivity. But, irrespective of the teaching of any book on this subject, it is essential that sound judgment and forethought be used in mastering each individual case as would be necessary in the successful management of any other business—the underlying principles do not differ.

Whomsoever enters the fur-raising business should not do so half-heartedly; they should start with a determination to make a success of it, and with a full understanding that there is yet much to be acquired in the school of actual experience.

To be successful, they must know their animals and determine every cause that produces effect upon them, whether good or bad; they must watch them, study them, observe their every little antic and know their condition every day. In fact, the attendant to his animals should feel it incumbent upon himself to make their lives a part of his own existence to the extent that their welfare and his should blend, harmoniously, to an integral.

The ranchman should subscribe to the different magazines devoted to fur raising and study their every issue, because new ideas and theories are being developed each season. Without the aid of these publications the ranchman cannot keep pace with all the advancements that naturally follow the course of experiments conducted.



A—Barbed wire guard above top turn-in. B—30" tin border around the top. C—Underground concrete turn-in. D—Underground meshwire turn-in. E—Compartment pens. F—Drop door.

THE PANTOMIMIC LANGUAGE OF WILD ANIMALS

There is an age-old belief among many naturalists that all wild animals, of a kind, have an inaudible means of communication with one another. Whether this is true or not, it provides considerable food for thought, because there are many known instances in which men have been attacked by wild animals when every one of its kind within the immediate surroundings would attack with concerted action.

These facts furnish sufficient material to support the opinion of theorists that nature's strange provisionals have bestowed upon these little inarticulate animals the super-power of pantomimical understanding among themselves; a theory as weird and uncanny, as it is apparently true; although, throughout the ages of scientific reasoning, it has been beyond the perceptive power of man to prove it.

GENERAL FENCE AND PEN CONSTRUCTION

With the accompanying illustrations the explanatory text on the basic principles for building pens for fur animals of any kind is more lucid. Varied differences in construction and in material used must be governed by the individual requirements of each kind of animal kept, which could be easily determined by a close study of the article devoted to it. For instance, a sixteen-gauge two-inch mesh galvanized wire should be used for either Fishers or Foxes, whereas a three-fourths inch, number twenty poultry wire would do for Ermines.

While a two-inch mesh number twenty poultry wire would meet all requirements for completely covering over a Fox pen, it would not do for Fishers, yet these animals are about the same size.

Some ranchers set their posts in underground concrete sockets, while others do not see the need of it. In any event, all posts must be firmly set to support a strongly constructed fence that will securely retain the animals for which it is built. The posts should be not more than twelve and a half feet apart. They may be of wood, or of iron, as the builder sees fit.

The strands of barbed wire shown on top of the pen section in the illustration are for use upon the guard fences only. Pens within the Guard Fence would not need this protection against strange dogs or intruders generally. The top turn-in shown immediately beneath the barbed wire, at letter "A," may be of mesh-wire, boards, or metal, of widths and material required for different animals.

Some ranchmen cover all breeding pens completely over with mesh-wire, as shown by the letter "E." In this event the top turn-in is not needed, but in the absence of the Guard Fence, especially where the pens are not completely covered over, the barbed wire protector around each pen is well worth the cost of it.

Other successful ranchmen, with some animals, construct their pens with long boards set well into the ground, standing on ends to a height sufficient to retain the animals. Boards would make an excellent Guard Fence, and would do very well for breeding pens of extra large size, but where these pens are built in keeping with the dimensions commonly used, boards would

so prevent the circulation of fresh air that it seems as if the pens would become insufferably hot from the rays of the mid-day summer's sun. Boards would also obstruct the drainage of pens from which unclean conditions would result.

The underground construction for breeding pens should be by means of a trench about three feet deep by three feet wide, the bottom of which should be laid with concrete, or with mesh-wire, as shown by letters "C" and "D."

The wall or fence wire must in all cases firmly intersect with the bottom layer at the outer edge to preclude the possibility of animals digging their way to freedom between the two parts, for it is here that they will exert their energy, if they dig at all. This underground construction is not necessary for all kinds of fur animals.

Some men now ranching fur animals resort to extreme precaution by completely wiring their pens in, top and bottom. While this stand is well taken in some instances, it is an unnecessary expense in others. The reasons why, and why not, will unfold themselves to the reader as he studies the characteristics peculiar to each animal, which are given explicitly in this volume.

The completely covered compartment pens shown in the illustration are specially designed for foxes, yet they may be very advantageously used for animals of any other kind. The animals may be separated at any time by means of the drop door in the chute, or passageway, between the pens as shown in the illustration by the letter "F."

Instead of using the top turn-in, some ranchers border the top of their pens, vertically, with thin sheet iron, or tin, about 36 inches wide, as shown in the illustration at

"B," which serves efficiently for both inside and outside turn-in. But, in the event of strong winds the pressure against this border would be so very great that it would seem a difficult matter indeed to construct it with sufficient strength to withstand the resistance. Since we recently lost quite a number of animals in this way, from pens of this construction, they are not advised.

At letter "H" is shown a sloping roof to a covered-over pen. This pen construction is very good for animals of any kind where a covered pen is desired. It is specially desirable for foxes because it prevents their climbing to a point beyond the top edge of the wall which is only four feet high, precluding possible injuries to the animals from falling back to earth from where they had climbed.

But, in the case of minks, fishers, or martens, it would be of indifference whether the roof were sloping, flat, or otherwise, because these animals would climb it and run along the underside of it, invertedly, without the slightest signs of effort, and they would not fall.

While raccoons or opossums probably would not traverse a flat roof in an inverted position, they never fall, as do foxes, skunks, beavers, otters, muskrats, etc.

The parapet of these pens should not be more than three to five feet in height; the pinnacle of the roof may be as high as the builder sees fit to meet his own idea of convenience, or costs. The mesh of the parapets should be not greater than one inch, to prevent the cubs from hanging themselves by getting their heads fastened in it, which they have been known to do, for the mischievous youngsters are always in trouble.

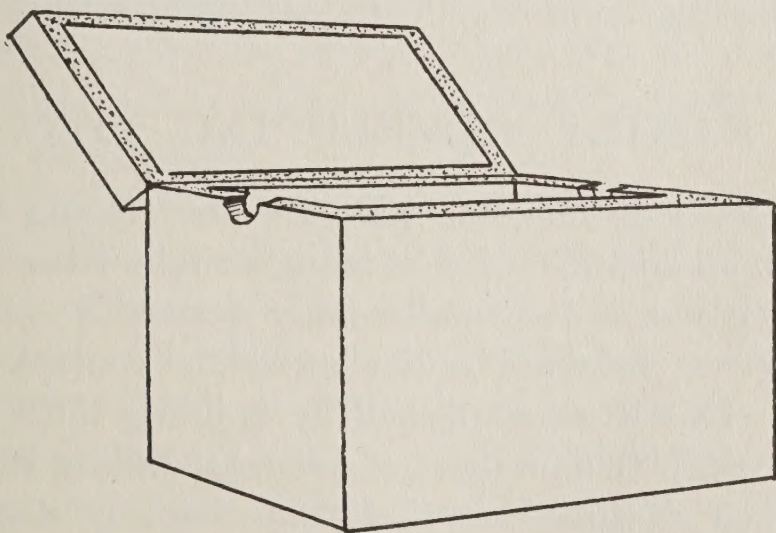
The height of fences, and size of pens required for

each of the different kinds of animals are explained under their respective captions.

For the back-yard ranch, in cities where space is limited, the pens may be tiered, one upon another, as they frequently are for guinea-pigs, and rabbits. The only difference would be in the size of the pens.

ANIMAL DENS CONSTRUCTION

Dens for fur-bearing animals of any kind should be constructed with double walls, or as a box-within-a-box. The sizes and the different arrangements of the boxes must be governed by the special requirements of the kind of animals that the dens are intended to shelter, but in any event the wall construction should not differ from that shown in the illustration.



Animal dens construction.

The outer box should be about six inches larger at the sides, top and bottom, than the inner box, and the intervening space should be filled with sawdust well packed down to preclude the possibility of extreme exentuali-

ties during periods of either very cold or very hot weather.

The top edges of these boxes should be grooved for a distance of six or eight inches at each end, so that when the lids are fitted over them ventilation will be admitted beneath the eaves without permitting either rain or melting snow to enter the dens. Other accessories, such as inside nest boxes, etc., are necessary for some kinds of animals, and will be found described in the separate articles devoted to them.

The entrances to the dens of all fur-bearing animals should be encircled with a heavy coat of tar to prevent black ants and other obnoxious insects from entering the nests to the annoyance and discomfort of the animals within. The tar line should be at least one inch back from the edge of the entrance to the nest, to prevent it from tearing the animals' furs as they pass through.

FAMILY DEVELOPING PENS

An excellent ranching plan for fur-bearing animals of any kind and one which is being used by some successful ranchmen, is the small colony system by which the animals are retained under complete control, indefinitely. This is accomplished by building large enclosures in which two mothers of a corresponding kind may raise their families together, thus entirely dispensing with the general enclosure, or developing pen. While the initial expense of this system will probably exceed that of other plans suggested, the additional cost and effort are counterbalanced by the many conveniences and advantages it offers.

Under this plan of operation, each breeding pen

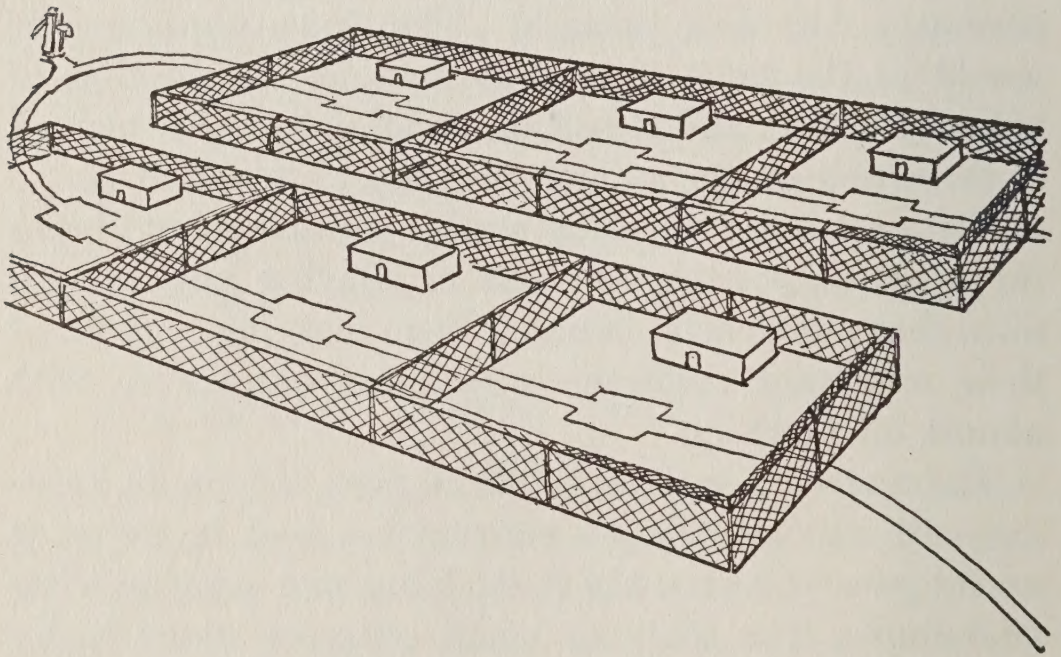
should be large enough so that two mother animals and their families may be retained in it until the youngsters are developed to maturity or until pelting time in the winter. The adult male breeders must remain within their individual pens at all times, except during the breeding routine as explained under the caption of "Breeding." Each colony pen should be at least twenty-five feet wide, by fifty feet long, requiring exactly one roll of wire for the fence walls; one roll for the bottom turn-in and one roll for the top turn-in unless it is made of some smooth material, which would be necessary for some animals. The fence requirements would be the same as explained under the caption of "General Fence and Pens Construction," or as explained in the article on the animals that are to be raised.

The nest boxes for each mother animal should be as far apart as possible to assist in allaying any antagonism that might arise between them over the conduct of their miscreant children—a common occurrence with almost all mothers.

The watering system for these pens may be in keeping with the attendant's convenience and facilities; it would greatly lessen the daily labor and provide other advantages if a chain of small concrete water basins were constructed, one water basin in each pen, and all of them connected with a continuous concrete trough running at a slight decline from the pump, well, or hydrant so that all pens might be watered from one point and by a single operation, as shown in the accompanying illustration.

These water basins may be constructed by digging a small trench a few inches wide and a few inches deep, through each pen. Then, at some level place in each

pen, make the trench considerably wider and deeper for a distance of five or six feet, to constitute the water basin. Line the ditch and the basins with heavy gravel or with one inch mesh heavy galvanized wire to support the concrete and prevent it from cracking. Then fill the trough and basins with concrete and use molds made of boards to press it into the desired "V" shape. When the concrete solidifies it forms water basins and troughs to carry water from the well to the animals in all pens, and at a single operation.



Family Developing Pens.

If this system is used for Minks, Beavers, Muskrats, Otters or Coons, the basins should be about two feet deep, five or six feet long and three feet wide with gradually sloping side walls so that when any young animals plunge in for a swim they can crawl out again. If the walls were perpendicular the young would drown in the attempt to climb out of the water. Skunks, Opossums,

Martens, Fishers and Foxes do not require bathing facilities, but the drinking water keeps fresher, cooler and cleaner in the larger basins.

In these large pens the young animals would get a greater range of exercise than would be possible in the smaller breeding pens; also, if the nest boxes are placed at extreme points from each other the mothers are not so likely to exercise their pugnacious activities disastrously, because the defeated animal has room enough in which to run and make her escape from the attacks of her assailant. It is not likely, even in view of their close proximity, that either one would enter the den of the other for a fight; this is not customary with wild animals of a corresponding kind. There is some danger of one animal destroying the other and resorting to cannibalism if they are driven to it through inattention to the food supply, and diversification.

All females that are retained in a pen may be of the same family, but the male with which they are associated during the breeding routine must be of unrelated stock in order to prevent inbreeding. All young males that are not pelted or otherwise disposed of by mid-winter must be retired to individual pens, otherwise, disastrous fighting and sometimes cannibalism will be the result.

Small developing pens induce hostilities among adult animals of any kind where they are retained collectively. Conversely, the larger pens greatly lessen the probability of fatalities by abating the pugnacious tendency of the animals confined within them. Therefore, the family developing pens should be as large as conveniences will permit. Spacious enclosures contribute many advantages other than preventing disastrous fighting.

THE MUSKRAT IN THE WILDS

The muskrat leads a more aquatic life, perhaps, than any other fur-bearing animal except the beaver, to which it is probably related, or it may be of the same genus. They have been known, from time to time, under several names, which were probably corruptions of various



Indian dialects, most of which if translated into English, would mean musk-beaver, little-beaver, etc.

These animals have glands emitting a strong odor of musk with which the entire animal is redolent in summer months; this odor pervades the skin only, during

winter, and to a lesser degree. From this musky aroma the prefix "musk" is probably derived, but there is no reasonable explanation to offer for the affix "rat" because these animals are not rats, any more than are rabbits; yet, they both belong to the rodent family. It is possible that the appellative "muskrat" is either a corruption, or a modification of the name "musquash" as the animal is known by some of the Indian tribes.

Muskrats are purely North American animals, unknown to any other part of the world; but, it is known that they will thrive in any climate, or in any country where farm vegetation, and tender grass roots grow. They are to be found in general distribution over nearly all parts of the continent, especially in its north, central, and northeastern parts. These animals are of such great numerical strength that they bring a tremendous annual revenue to the thousands of trappers who eagerly seek their pelts throughout the entire winter months, during which time it is estimated that they slaughter, on the average, from twelve to fifteen millions of muskrats each season for their skins. About one hundred trimmed skins are required to make the average medium length ladies coat.

In connection with this almost unbelievable yearly catch, hundreds of thousands of young muskrats are drowned in their dens when heavy rains overflow the streams in early spring, and when the swollen tides cover the marshlands in the coastal regions. Crows also are very destructive to young muskrats in open marshes where the animals' nests are built on the surface, devouring hundreds of thousands of the little hairless creatures each season. Hawks, owls, wolves, raccoons, opossums, minks, weasels, foxes, otters, skunks, etc., practically

live upon them, destroying countless thousands of them every year. Despite this tremendous yearly destruction which reaches into the millions, these wonderfully prolific little animals thrive and multiply to such a phenomenal extent that they are, apparently, as numerous each succeeding season, as they were previously.

Muskrats are more numerous in states east of the Mississippi River and north of the Ohio to the northern line of trees. From the southern line of Virginia to the Gulf of Mexico, and from that part of the Atlantic coast westward to the Pacific, they are practically unknown, with the exception of a large number of them confined to a very small area in the marshlands of southern Louisiana, a small colony in south eastern Texas, a few in the Pecos Valley through eastern New Mexico ranging as far south as the Rio Grande, and some in the Colorado Valley in Arizona, all of which produce furs of lesser value. The manner in which muskrats emigrated to these isolated spots, and the reason why they are not to be found in proportionate distribution in districts intervening would present a problem difficult to determine.

There are several species and color-type varieties of muskrats; those of the more southern, western, and northwestern range of their distribution are comparatively smaller animals, producing furs of lighter color, and of lesser value than muskrats of the northern, central, eastern and northeastern states. Muskrats are more prevalent, generally, in the vicinity of the eastern Atlantic states than in any other part of America, that is, around Delaware, New Jersey, and Maryland, where their little dome-like houses may be seen in all directions. They usually build their houses in the immediate vicinity

of where the more succulent grasses and water plants grow; they resemble disorderly stacked wheat shocks in a semi-submerged meadow.

In the marshlands of Maryland, lying between the



A typical muskrat marsh resembles disorderly stacked wheat shocks in a semi-submerged meadow.

eastern shore of Chesapeake Bay and the Atlantic coast may be seen a type of muskrats that are almost black, commonly known as Black Muskrats. While their furs are finer, the animals are not so large as the brown variety inhabiting the same district, nor as those of the central north. It is believed that this distinctive color phase is the result of inbreeding, causing abnormal pigmentation of the skin, from which the fur derives its

color. They are of smaller stature, physically weaker, and less prolific than the large brown type of the north central district.

This black variety inhabiting the shallow marshlands exclusively, disproves the theory advanced by some authorities that the deeper waters produce the darker muskrat furs. Muskrats of the far north also produce furs of lesser value, coarse and harsh.

Muskrats are vicious little animals that will fight savagely when they are first captured, using their long powerful incisor teeth, and striking fiercely with their front feet, in which they have great strength. They dart so quickly, by swinging their bodies around on their hind feet, that one was known to inflict a serious wound in a man's hand from a distance of about two feet before the hand could be withdrawn; the man was watching the animal closely, anticipating such an attack. I was a personal witness to this encounter while trapping muskrats, alive, for breeding purposes along the shore of Lake Huron. Muskrats have been known to attack men and fight fiercely when approached at a considerable distance from water, probably because they realize the disadvantage of their position on dry land, yet, when brought into captivity and gently treated, they so readily become tame that their former ferocity would seem hardly credible; in fact within two or three days after being captured they will stand on their hind feet and take food from the hand, apparently, without fear.

Muskrats may be handled by lifting them by the tail, with little or no danger of being bitten; after they have been lifted a few times and immediately given food while being so held, they seem to realize that they are to be

fed, and not to be harmed. It is really remarkable to observe how quickly their fear of man is dispelled through gentle treatment.

Muskrats in search of food, in the wilds, are quite active both night and day when under the cover of water and ice, but they are habitually nocturnal in the open; seldom are they seen in broad daylight. On ranches where they are not trapped or hunted, it is a common sight to see them at almost any hour of the day busily engaged building houses for winter occupancy or repairing their old homes just previous to the approach of cold weather.

Though comparatively diminutive and of weaker construction, muskrat houses very much resemble those of beavers; they are usually from five to six feet in diameter at the base, built dome-like to a height of about three feet above the water. Muskrats make their nests in the dry, about the center of that part of the house that extends above the water. The entrance to the house is always from beneath, at the bottom of the lake, well below the freezing line.

If the water in which the house stands is too shallow



They soon recognize the source of food supply, and welcome it.

to prevent freezing at the bottom, they invariably burrow completely beneath it, forming a subterranean tunnel leading out to where the water is deeper so they can come and go safely below the freezing line. This tunnel is sometimes ten to fifteen feet in length, or long enough to reach deep water.



The entrance to the house is from deep water, well below the freezing line.

It is the nature of muskrats to burrow into embankments, or to build houses in the water, as described in the foregoing, but the following articles will suffice to show that these busy little animals will adapt themselves quickly, to almost any condition, seemingly none the worse for the change.

While trapping along the shores of Lake Huron recently, I observed a number of snow-covered mounds resembling shocks of wheat three to four feet high, on an island, in a bay, a short distance out from mainland. Crossing the ice to the island, these miniature mountains proved to be snow-covered muskrat houses, built entirely upon dry land, above the line mark of high tide, as indicated on the sands of the beach. One of these houses, in particular, was of unusual dimensions, meas-

uring about eighteen feet in circumference, and three and a half feet in height, standing in the tall grass, at least twenty feet from the waters' edge. Close examination disclosed two underground tunnels leading from beneath this house, to water, below the ice, and one open miniature canal about eight inches wide (known to trappers as a "run") leading to the water's edge. This "run," of course, was frozen to the bottom at this time, making it necessary for the animals to reach the water through the tunnels only.

On further examining this little island, I discovered that the crust of its surface was entirely undermined by a perfect labyrinth of passages, into which my feet would sink, sometimes to my knees, at every few steps, because the sandy soil above these tunnels was not firm enough to support my weight.

On another occasion while on a research tour along the eastern shore of Chesapeake Bay, I penetrated an extensive marsh (in wading-boots) where my attention was attracted to a muskrat mansion about twenty-five feet in circumference, at its base, standing in water knee deep, out of which it rose to about the level of my



Muskrat houses upon an island, on dry land.

shoulders. This structure was so unusual in its dimensions that many of our long experienced trappers would be inclined to doubt any statement as to the size of it.

On a research trip to the Dismal Swamp later I found a muskrat house built upon a large log which led out from the bank into the water. This house stood at a



On the Potomac.

point on the log entirely above the high water mark. On another occasion I examined a muskrat house similarly built on a large sycamore log which led into the back waters of the Potomac River, near Washington, D. C.; this house was also entirely in the dry, at least fifteen feet from the water's edge, and above the point of possible inundation.

I have retained muskrats for a considerable period in cages, and in enclosures on dry land, with no apparent physi-

cal effect. They will occupy artificial houses built for them as readily as they will those of their own construction, even when the entrance is made at the top instead of at the bottom.

Although muskrats sometimes bring up their young in absolute seclusion, within their houses, or burrows during winter months, they usually build nests and raise the

mid-summer litters in a small brush pile, or under a heavy clump of shrubbery on open earth, where they make a nest of dried grasses sufficient only for protection from the direct rays of the sun.

On visiting the marshes, known as "floating prairies," along the Gulf coast of Louisiana recently, it was found that nearly all muskrats build their nests and bring up their young under tufts of grass, entirely in the open. It was also observed that their houses, as well as the animals themselves, are much more diminutive than those farther north.

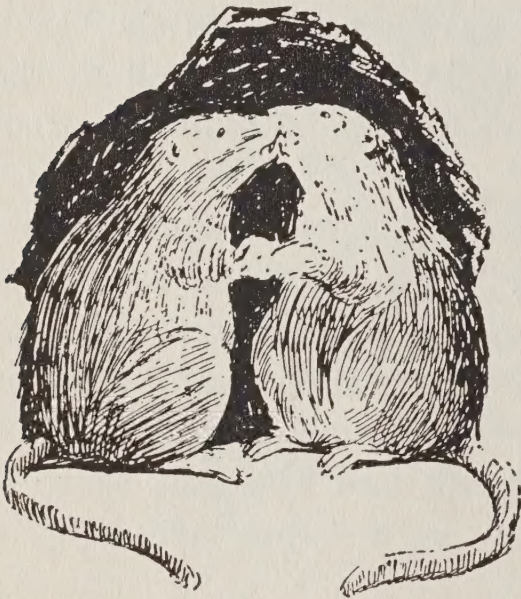
The small colony of muskrats located in southeastern Texas are of a considerably larger type, and are better furred animals than their Louisiana neighbors, although their living environments, food properties, and climatic conditions are similar. These animals of the extreme south are apparently as strong and vigorous as their kindred of the north, and both types are equally prolific.

I also observed, while in New Mexico and Arizona, that the muskrats of that locality have coarser coats, of a reddish tint, more akin to hair than to fur, probably due to the alkaline contents of both soil and water prevalent in that country.

When strange male muskrats meet they fight each other fiercely, rolling over and over in desperate combat until each severely punctures the other's pelt. They will then rear upon their hind feet, stand face to face, each holding the other at arm's length by grasping their biceps exactly as wrestlers would do; then they will reach over and crack their teeth together for a few moments, each in an effort to determine whether the other is sufficiently armed to protect himself. They will

then go their way, as the best of friends would do and nest happily in the same den together. However, if either one shows a physical inability to protect himself, the other will pounce on him each time they meet.

Muskrats are naturally burrowing animals, confining their operations, usually, to within a few inches of the



They kiss and make up after a fiercely fought battle.

surface. Seldom, if ever, entering the sub-soil except where it is soft or sandy. Instead of burrowing into the depths of the earth, as many believe they do, they are more inclined to begin digging in the bed of a stream and tunnel upward through the bank of it as long as the water follows to keep the earth soft. They will discontinue this tunneling

shortly after the water ceases to flow, and make their nest in the dry, about two or three feet up from the water's level. Several animals will work together in alternate turns at this tunneling by which the work is greatly expedited.

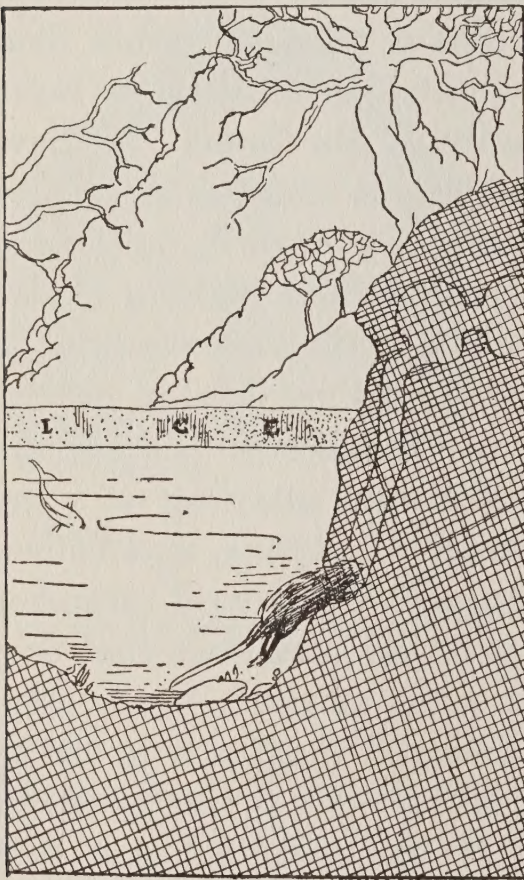
When more than one muskrat is caught in a box trap at the same time, they will often effect their escape by prying open the swinging door, unless it is very securely constructed. They seem to work together in this effort, each lending help to the other in perfectly peaceful terms until the trapper arrives, when they will try to attack him, concertedly. Finding that they cannot reach

him, each will blame the other for its predicament, when they will immediately pounce upon each other in terrific combat, desisting only when the trap is put in motion, as by carrying it.

They do not renew the conflict after they are delivered to a retention, neither do they fight while in transit, as in shipping, but they will pounce unmercifully upon the back of every new captive that is released within their pen until he establishes his right to citizenship by holding his own against the bully of the bunch. I have shipped muskrats for a considerable distance in wooden crates, and have received them, so shipped, on several occasions without any evidence of their making efforts to escape by gnawing out. Yet, if they are confined in a box over night, unmolested, it is reasonably certain that they will gnaw their way to liberty. I have observed that muskrats will discontinue gnawing on a box immediately upon the approach of anyone, and believe that the rumbling of the train, and the general tumult in and around an express car so intimidates them that they do not attempt to gnaw out while en route to the shipping destination. I have trapped muskrats in barrel traps from which they gnawed their way to liberty within a remarkably short time. It was observed that they invariably began gnawing directly at a place through which they could see the light, as the small space between the staves of an apple barrel.

On the ranch, where artificial nest boxes are provided for muskrats, it is amusing to watch one of the animals attempting to enter the house of another. He will jump out backward with remarkable suddenness, and will seldom stop running until he safely reaches the confines of his own castle. A terrific slap in the face admin-

istered by the occupant of the house with his powerful front foot explains the hurried exit of the intruder, and his immediate desire for peaceful security within his own sheltering shanty after having failed in his attempt to enter a stranger's home uninvited—an unethical act in that polite colonial society.



The entrance to the den in creek banks is always through a tunnel leading from below the freezing line.

In districts where banks of streams are high enough to permit nesting in them, muskrats always make their dens in the banks instead of building houses. They start the burrow under water, in the bed of the stream, well below the freezing line, tunneling upward until they reach a point about two feet above the water's level where they usually make two excavations each about the size of an ordinary wash basin, with a tunnel connecting them. In one they nest, while in the other they store

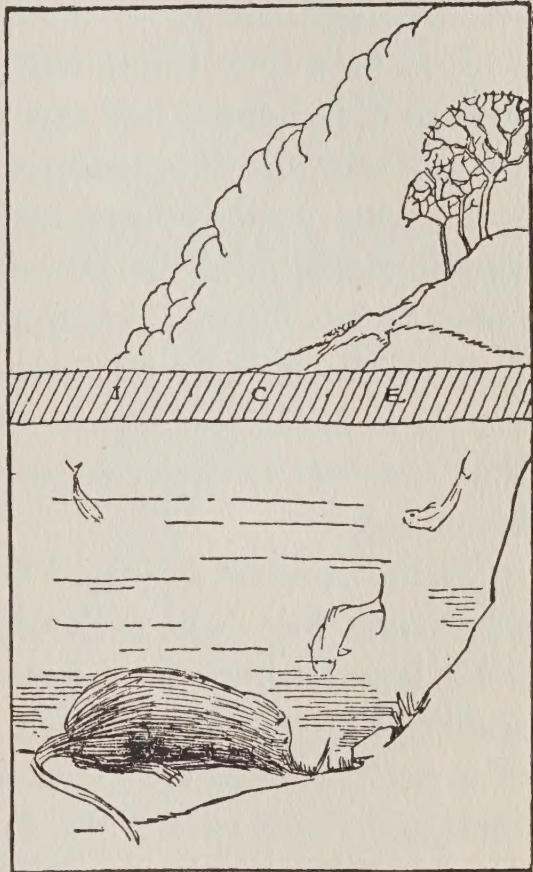
up food for sustenance during periods of extreme cold.

The theoretical assumption is that muskrats living in these underground burrows, in creek banks, get their air by inhaling the oxygen in the earth. Some experienced trappers insist that muskrats dig a small air hole leading from the nest to the earth's surface. This is

effectively disproved by the fact that they could not dig an air hole that would be smaller than the animals themselves; furthermore, air holes would permit the nests to become water soaked during winter rains.

During hard rains when the creek banks become swollen to the point of flooding their nests, it is said that the mother muskrats drag their young to safety upon the earth's surface to prevent their being drowned within the dens.

Where they inhabit lakes or streams which freeze over, they seek their food under the ice throughout the entire winter. As they gather this aquatic vegetation from the lake bottom, they carry it to their dining room to eat it. But in many cases, during long winters when their local food supply becomes depleted, they must make distant jour-



Digging food from the lake bed, below the ice.

neys under the ice to fields more productive of food.

In this case they construct a dining room on the ice, above the food beds, into which they take the vegetation so it can be eaten out of water. Inasmuch as this dining room must be constructed on the surface, makes it necessary for the animals to cut a hole through the ice, from

the under side, which they do in a remarkably short time, even in cases where the ice is from fifteen to twenty inches thick. This work is expedited through the efforts of several muskrats drilling in alternate turns. If one shirks the work by skipping his turn to drill, the others will fight him away from it thereafter, forcing him either to build a house of his own, unaided, or to flee the field.

Just how they know when each one's turn to work is in order, is indeed but one of the many mysteries that we meet with in the strangeness of wild animal intuition.

As soon as they have drilled completely through the ice, they will daub the tunnel walls with mud and water moss, to prevent its freezing up again; then on the surface of the ice, directly over the tunnel, they will construct a perfectly decent "country road-house" which they conduct in strict compliance with the recent prohibition act.

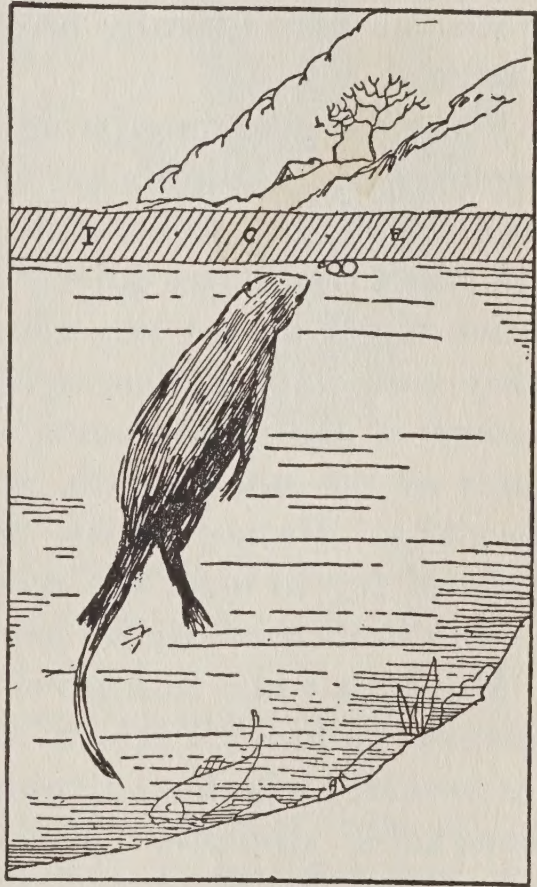
Then, as they dig food from the bottom of the lake, or stream, they take it through the passage-way into the little house where they can sit up on their haunches, as squirrels do, and enjoy their dinner with all the comforts of a *real roadside inn*, minus the cook. They then refill their air pouches for the long aqueous journey homeward, under the ice.

In summer, when the water is not frozen over, they carry their food to some favorite log, rock or small knoll which they use as a dining table, where they wash everything before they eat it.

Muskrats are peculiarly provided by nature with an air pouch which they fill as needed, by inhalation, enabling them to remain under water from twenty to twenty-two minutes. They then come up to the under-

side of the ice and exhale against it, the breath remaining stationary in bubble formation. After waiting a few moments for the air to become oxygenized again by direct contact with the ice, they re-inhale it and continue their journey. By this system of refilling the air pouch, it is popularly believed that they can remain under the ice for an almost indefinite period. When under water that is not frozen over, they exhale continually, returning to the surface for air more frequently than they do when under the ice. This continuous exhalation is evidenced by a succession of little bubbles rising from their noses to the surface, during the entire period of submergence.

Water, other than for drinking, is not at all essential to the existence of muskrats nor to the quality of their furs if they are protected against extreme barometric eventualities, but if they are unduly exposed to cold winds or to very hot sun, they perish within a short time. Water seems to be merely a means of transportation and protection, as nature has provided in some form for every living creature; muskrats are not swift swimmers, nor do they swim gracefully because of



Exhaling its breath against the ice to be re-oxygenized.

awkwardly wagging their hips much as a fish uses its tail to assist in attaining speed.

Because most of their food is available only in and around water, especially during the winter months, explains the reasons why they are seldom seen elsewhere in cold weather. Contrary to general belief, they do not, as a rule, live in swamps, for the open marsh lands in which they are usually found in greater profusion more liberally provide the essentials to their existence.

From the preceding paragraphs it will be readily determined that muskrats are not heir to any specific confines. They are so versatile in their nature that they will adapt themselves quickly to their environments, and thrive under almost any conditions or in any climate. They seem to be as thoroughly "at home" in the snowy regions of the frozen north as they are in the marshy lands of the sunny south, apparently none the worse for either. Nature quickly provides them with suitable coats of fur to meet the requirements of approaching seasons in their respective habitats.

Muskrats when full grown are about the size of the common cotton-tail rabbit. Both front and hind feet are provided with long digging claws in which they have remarkable strength. Their hind legs are so much longer than the front ones, and so loosely jointed, that the animal's locomotion over land is considerably impeded by a pronounced limping hop; but these loosely-jointed legs serve them efficiently while swimming, for they can turn them in almost any position, especially the hind feet, which seem to work as if set on pivots.

While the hind feet of a muskrat are not webbed, they appear to be slightly so because they are long, broad

and of a peculiar shape. They have a complete hedge-row of stiff bristles lying along with and between the toes of the hind feet, extending to the intersection with the claws. These bristles are not noticeable while the animal is out of water, because they fold down to and almost invisibly between each toe. When swimming, these bristles come forward and spread out much like a fish's fin, but horizontally, causing the effect of a web-foot from which the animal gets much of its power in water. They also have a slight hedge-row of similar bristles on the upper edge of their flat, rudder-shaped tail, extending nearly the entire length of it, serving them efficiently as a rudder while swimming. When muskrats suspect danger, they will slap the water with their flat tails, as they dive, causing a sharp report, whereupon every muskrat in the immediate vicinity will disappear simultaneously under water.



There is no web.

Muskrats bring a tremendous annual revenue to the trappers of America because of their numerical strength, and for the reason that their pelts meet so many needs in the fur-manufacturing business. Yet their actual economic value to the country in general is considerably offset in the inestimable damage they do to dikes, river levees, reservoirs, roadbeds, and other artificially constructed waterways, by burrowing into the embankments to such an extent that the structures are weakened

and frequently wrecked by the water breaking through them.

As a precautionary measure against muskrat activities of this nature, owners of mill-dams, canals and artificial waterways find it necessary, in many instances, to employ men for the sole purpose of exterminating the animals, only to find that because of their enormous multiplication they re-stock the places as rapidly as they are destroyed, especially in the immediate vicinity of marshlands where the animals abound because of the natural aquatic food supply that exists in such places. Instances are known where mill-dams have been burrowed into by these pernicious little pests to an extent permissible of the water breaking through to complete destruction of the dam, and flooding the vicinity to the loss of several thousand dollars by water damage.

The muskrat has long glossy over-hair, or guard-hair, covering the under fur which is so fine, so dense, and so thoroughly waterproof, that irrespective of the period of submergence, water never reaches the animal's skin. The more common color of the muskrat fur is a dark umber brown, the exact shade being governed by season or by geographic location.

In the raw state the muskrat fur in general appearance is similar to that of the beaver. However, the pelage is shorter and probably not so durable. Compared with furs of other animals of a similar size, muskrat fur is of excellent quality and durability, for which there is a constantly growing demand, as visualized in the following tabulation:

“From 1763 to 1800 approximately 75,000 muskrat skins were sold in London annually. From 1801 to 1850 the yearly average was about 411,000. From 1851

to 1900, inclusive, the average was 2,534,000. In 1914 they reached the summit when 10,488,647 skins exported from America were sold in the London market, many of them finding their way back to our own market in a different form. Since that time the market for these furs has been transferred to this country." These comparisons will give a fair idea of the tremendous growth, and increasing popularity of the muskrat fur.

The muskrat is *king* of fur-bearing animals because of its numerical strength, the quality of its fur, and the many purposes for which it may be used. Hudson Seal, Electric Seal, Brook Mink, French Seal, Ondatra Seal and many other kinds of fur are made from the pelts of muskrats.

The muskrat skin was of little commercial value prior to the development of its many uses but advanced steadily thereafter, reaching the pinnacle in 1920 when prime skins brought \$6.75 each, and it is reasonable to presume that the prices will remain at a high figure, except perhaps during temporary market fluctuations. Muskrat pelts do not become fully prime until early in the spring just before shedding time, though fur buyers usually grade those that are taken in December and January as being prime.

Since laws are now in effect, and rigidly enforced in nearly all states, preventing these animals from being trapped in the early spring, a perfectly prime muskrat pelt seldom, if ever, reaches the market in a legitimate way. Furthermore, the great army of eager trappers go out in the early fall, at the very beginning of the season, in order to make large catches while the animals are plentiful, and trap them off so rigorously that the animals become so scarce long before the time when their

pelts would be prime, that it would not be worth the time and effort to set out a trap line in the hope of procuring them, even though the law did not prohibit.

In nearly all of the states animals on fur ranches become domestic property through payment of a small license fee, and may be taken at any time of the year regardless of the conservation laws. In that case a ranchman has no excuse for offering to the market furs that are not prime, or that are damaged by the trap which is dispensed with on the ranch. Therefore, he may have reasonable assurance of being able to demand and receive *the top price at all times*.

Buyers for large fur houses are quick to recognize values, and when the ranchman makes his "quality furs" known to them, he will always be able to dispose of his pelts at premium prices. The large fur houses are always on the alert for prime pelts and are willing to pay the price for them. They will always treat the shipper fairly and will cater specially to those from whom they receive attractive furs, thoroughly cured, properly stretched, and well bundled and tagged, so they can handle them intelligently.

Some visionary muskrat ranchers have advanced the idea that, as these animals do not leave the water as long as there is food, they might be successfully raised by running two wings of mesh wire fencing across a creek at a sufficient distance apart to include the desired acreage for the ranch.

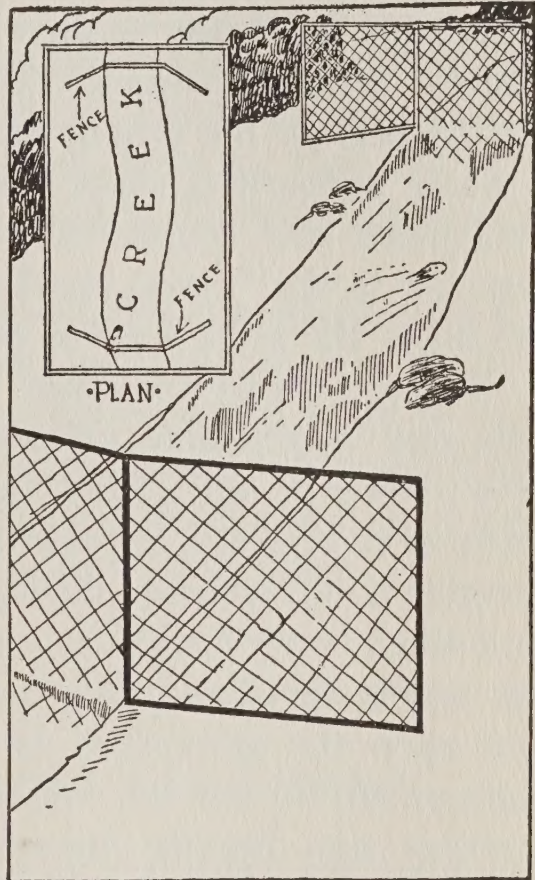
It is true that many muskrats might be retained in this way, but having had considerable practical experience with these busy little animals, I do not believe that one could accomplish more than to create a trapping field that would be a little more productive perhaps than

if the fence did not exist. In the first place, the fence would have to be sunk completely beneath the creek bed, to hard earth, or to a stone bottom, otherwise the animals will surely dig under it, then the fence would remain only as a shrine in memory of a futile attempt.

Undoubtedly this theory had its origin in an erroneous impression with many of the uninformed, that muskrats do not leave the water as long as there is plenty of food in sight. They have been known to travel long distances across land, migrating to new marshes when the breeding season is at its height in search of unrelated mates, or when the animals become too greatly congested in any one field. The number that would remain between the fences would not be

greater than in any other well stocked area where natural food exists in sufficient quantities to sustain them.

As a rule, a creek bed will not furnish a great amount of food for muskrats; a fenceless marsh would be more productive of both food and animals. The fenceless marshes of Maryland have been extremely profitable in muskrat production; these marshes are so numerous



A theoretical ranch construction.

there that the muskrats simply migrate to and from, averaging up for the marsh owners.

It is well known to the more observing trappers that these animals know when they are being trapped. If they are too rigorously sought in any one field, they have been known to desert it entirely, leaving it barren until other muskrats migrate to it for the same reasons that the former occupants fled the field. Muskrats will readily occupy the abandoned houses of others.

Some authorities claim that muskrats living in embankments and commonly known as "bank rats" are superior to the "marsh dwellers." Since these animals are all of the same species, each readily adapting itself to the customs of the other, it does not appear likely that any appreciable difference between them could exist; however, any slight variance could easily be attributed to the bank rats having warmer and more comfortable living quarters during early winter prior to the time when heavy snows form additional walls protecting the marsh dwellers from the cold winds—both kinds live upon the same food and procure it in the same manner, under the ice. After the houses in the open marshes are heavily covered with snow, the dens within them are fully as warm as those within the embankments would be, perhaps warmer, because of the absence of moisture that the earth gives up to the bank dens. Wherever there might be a visible difference in the pelage of the two kinds, it would very likely be apparent only upon the animals that are trapped in the early winter before the advent of heavy snows.

Muskrats are much more active, and venture farther from water during damp, rainy nights, than at any other time, for they have a greater feeling of safety on land

when they know that their enemies, the foxes, minks, wolves, coons and owls are less active. It has also been observed that muskrats will wander along leisurely on parts of earth where there is no snow, but when they reach a snow-covered place or even a narrow stretch of white sand, they invariably run at full speed until they are safely on dark soil again, because they are aware that the light-colored or snow-covered ground more plainly reveals their presence to alert enemies that might be lurking in ambush, such as the foxy little fox—hence the hurry.

Muskrats offer greater possibilities for ranching under the natural plan than do any other members of the fur-bearing family, with the possible exception of the beaver; any of these animals would migrate to less populated marshes or streams, abandoning the available food supply in order to escape overcrowded conditions.

PLAN NUMBER ONE

THE MUSKRAT UNDER SEMI-CONTROL

Under this plan of ranching muskrats the necessary investment for equipment is not excessive; neither would the animals require much attention other than to provide enough food to sustain them, which should be done rather than to attempt letting them feed themselves entirely from nature's own source. The number of muskrats that may be raised in any sized space is entirely dependent upon the amount of food furnished, or upon the natural supply of it.

If a shallow saucer-like lake or marshland is not available to the ranchman, he should construct an artificial

condition with a large area of shallow water in it, as in a flat irrigated tract. The shallow water provides a greater natural food supply, as well as a larger water-space in which the animals may build their houses. This will save the attendant the cost and labor of building many artificial nesting places that would otherwise be necessary.



A semi-natural plan.

If muskrats are to be raised in numbers sufficient to develop the undertaking into a profitable enterprise, an enclosed area of at least ten acres is required; most of it must be under shallow water forming what is known in some of our Gulf States as a "floating prairie," around which a ditch about three feet wide and one and a half

feet deep for a fence should be dug at a distance of about two hundred feet from the water's edge. The bottom of the ditch should be carpeted from wall to wall, forming an underground turn-in either of heavy stones, concrete or sixteen gauge, one and a half inch mesh, galvanized wire.

The fence also may be of mesh wire, sixteen gauge; it should closely intersect with the bottom turn-in at the outside wall of the ditch and extend about five feet above ground. It should be topped both inside and outside with a few inches of turn-in made of either metal or boards, to prevent the muskrats from climbing out, and minks from entering, which they would do if the fence is not high enough to keep them out. A few minks would destroy the muskrats as fast as nature could produce them. They will enter many muskrat houses in a single night and kill every young animal they can find regardless of whether or not they are hungry.

Fences within the main enclosure need not be more than two feet high if minks are kept out. Muskrats do not jump, and could not climb the fence if it were not for the meshes of the wire providing footholds for them. If the ranch is located where there would be no danger from minks, the fence may be only about three feet high, with a turn-in at the top, about eight or ten inches wide.

A few strands of barbed wire should be strung around the top of the fence, to keep dogs out. A more lucid information on constructing the underground turn-in is given under the caption of "General Fence and Pens Construction." The variation being in the depth and width of it, as would be necessary for different kinds of animals.

Wherever water touches the fence, or comes within a few feet of it, care must be taken to dig the ditch completely down to hard earth, and lay a wide turn-in at the bottom, otherwise the animals will dig out, because they burrow continually wherever the water follows to keep the earth soft. They are not given to burrowing into dry earth unless it is soft, or sandy; they are more inclined to dig toward the water rather than from it, excepting where they make the beginning in the water, in which case, of course, they burrow from it.

Muskrats raised in these enclosures will soon become so numerous that they will consume all natural food unless it is extremely abundant. It is just as well that they should destroy most of it because when they form the habit of coming to the feeding pens for food, at regular intervals each day, the attendant could control them advantageously.

A natural food supply should exist during spring and summer, to give the young growing animals something to work for, contributing the needed exercise to develop their bones and body. This requirement is best met by planting vegetation within the enclosure around the watered portions, and in the water. Wild rice, water lilies, cat-tails, etc., are very good for the water vegetation. Carrots of the quick growing kind, such as the Oxheart or Gourand varieties, make good land vegetation because these grow near the earth's surface and may be sown broadcast around the marshland, where the muskrats will dig them out as they want them. Jerusalem Artichokes and parsnips are also very good for this purpose; they will need no further attention after they have once been planted in naturally rich or well fertilized soil; the muskrats will dig them out as they want them during

the winter. Extracting succulent roots of wild rice from the bottom of the lake or marsh will keep the animals well occupied during winter when the surface of the water is frozen over or during tempests when they would not come out in the cold wind.

If any reasonable degree of success is hoped for, the attendant must keep his animals under some manner of control, as he would his hogs, cattle, or his chickens. About the only feasible way of maintaining this control is to construct a number of feeding pens, within the main enclosure. These pens may be of ordinary chicken wire number twenty gauge, one inch mesh; the ditching and underground turn-in heretofore mentioned is unnecessary if the fence closely intersects with the earth at all places so the animals cannot crawl under it and escape to the marsh; in that event they would likely not return for a day or two, or until they get hungry.

These pens would be most economically built in triangular form with one side running parallel with and close to the water's edge. The dimensions should be not less than 16x16x16 feet, requiring about one-third of a roll of wire for each pen. The entire panel which faces the water should be made into a drop gate that may be raised a few inches and lowered at will, by means of a cord, or wire, extending a few feet beyond the corner that is farthest from the water and attached to a stake, stump or a box upon which the attendant may sit while he is waiting for the pens to fill up with muskrats that are lured there by the food placed within, when he can lower the drop gate, drive the animals through a chute into an adjoining pen, similarly built, raise the gate again to admit other animals to the trap while he is selecting the desired ones from the first catch.

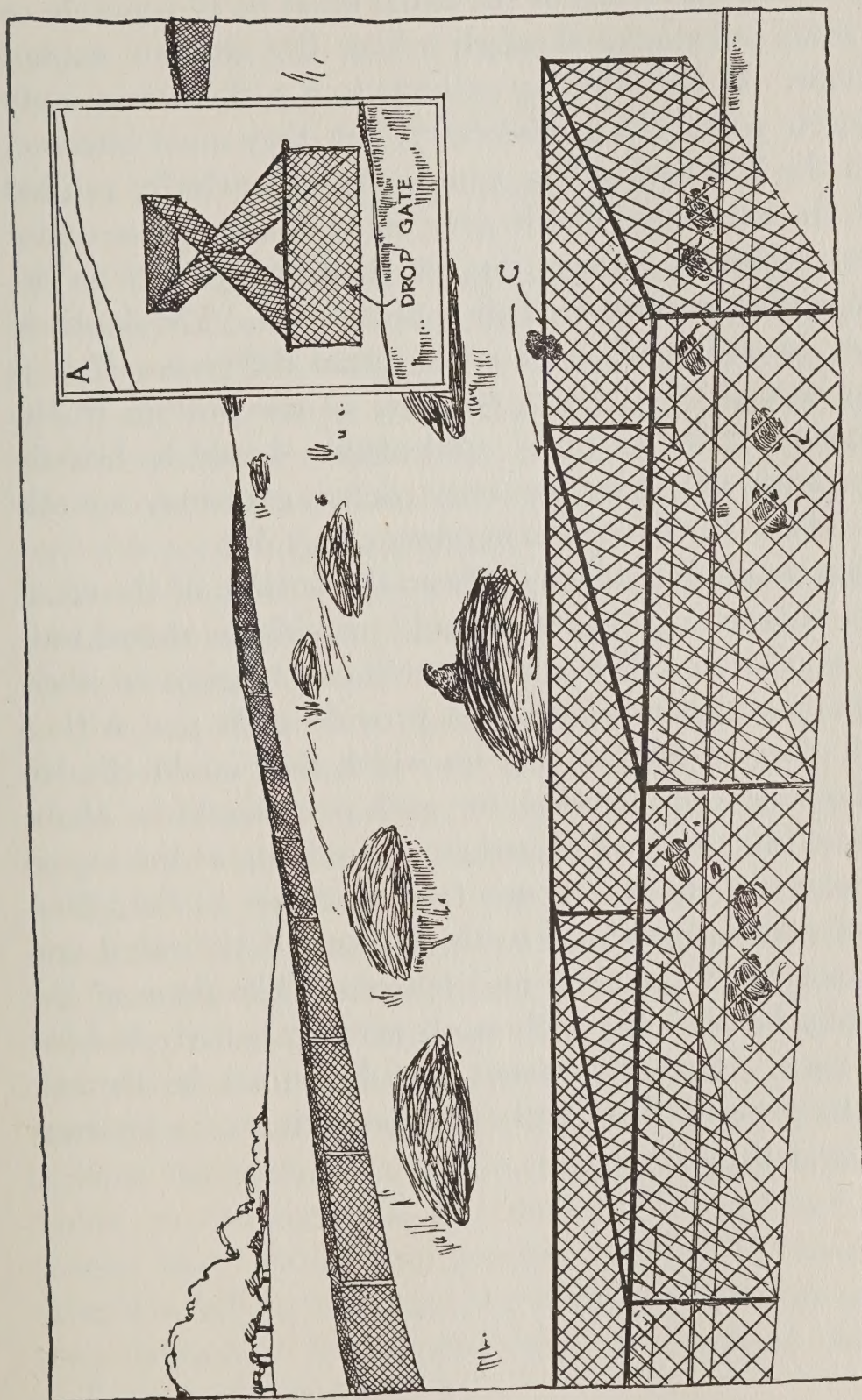
PLAN NUMBER TWO

THE MUSKRAT UNDER FULL CONTROL

Preparations for this plan of muskrat raising are much more expensive than those of plan number one, but it is a much more productive system because the attendant has all of his breeders under individual control, where mating, breeding, and selecting the breeders may be handled more advantageously, enabling him to develop superior specimens, as well as to secure greater production. Under this plan an all black strain of the large type may be developed by the application of a little care and good judgment in mating the animals.

The first essential is a natural or artificially constructed marsh of about ten acres. A fence similar to that described under Plan Number One must completely encompass the tract. In addition, a canal, or series of canals, must be constructed, about five feet wide, or wider, and of sufficient length to accommodate as many females and as many male breeders as are to be maintained. Breeding pens must be constructed, horizontally, across the canal. They should be about ten feet wide, and twenty feet in length, with an equal part on each side of the water. This would give the animals seventy-five square feet of ground space on each side of the canal, with fifty square feet of water space in each pen. The general construction of these breeding pens is visualized in the accompanying illustration.

Four females and one male may be kept in each pen, with two dens of artificial construction on each side of the canal, as near the water as possible. Another den may set at any convenient place.



SYSTEM FOR BREEDING UNDER CONTROL.

A—Feeding pens. C—Breeding pens built across a canal. Each pen retains a breeding unit.

The bed and walls of the canal must be of concrete or of some substance through which the animals cannot burrow. If the ditching extends to a rock bottom, only concrete walls will be necessary, but they must intersect with the bed rock. The canal may be partially refilled with the excavated dirt to give the animals a place under water where they may dig, as they always like to do, thus adding greatly to their contentment. The depth of water in the canal is of no material difference if it is deep enough to prevent freezing to the bottom to the exclusion of the animals. All canals should be heavily sown with wild rice, or some dense growing, aquatic vegetation, for which the muskrats may dig.

Tile channels leading up from the bottom of the canal to the entrance to the dens would provide an almost natural condition. It would contribute largely to their pleasure and contentment to provide each pen with a short piece of floating log on which they could climb.

The mesh wire fencing for each pen should be about two feet high with a few inches of overhang at the top so they can not climb out, nor from one pen to the other. This fence must extend to the bottom of the canal and intersect firmly at sides and bottom. The floor of the pen may be carpeted with mesh wire, or heavily bedded with rock. In either event the dirt must be thrown back to prevent their feet from becoming sore by running over it.

PLAN NUMBER THREE

(Theoretical)

DRY LAND RANCHING

Dry land muskrat ranching as a permanent plan does not offer flattering possibilities because of the animals' inability to survive exposures to cold winter winds, or to hot sun of summer without access to water for relief. If the ranchman could devise some economical manner of protection from these extremes the plan would present a more favorable aspect.

About the only apparent means of that provision without incurring a prohibitive expense would be to cover a large portion of the ground within the enclosure to a depth of not less than eighteen inches with either alfalfa or clover hay, or with some of both kinds, under which the animals will make many runways through which they will pass at all hours, day and night.

While any kind of hay would meet the requirements for shelter and protection, both the clover and alfalfa hay provide food on which the animals may nibble, as they like to do, at frequent intervals, day and night, they will also build houses with the hay in the same manner as they would do out in a lake or marsh. To guard against the probability of the animals digging under the fence, to freedom, the hay covering should not come nearer than about two hundred feet of it; roadways should be left between the hay beds so that the attendant may replenish the supply whenever needed without walking or driving over it.

With the exception of retaining a few muskrats under

this plan myself, while trapping them out of the wilds for breeding stock, I know of no other one ever attempting this experiment. I retained them long enough only to determine their readiness to adapt themselves to the conditions; the feeling of security under cover lends contentment with environments that would otherwise provoke restless timidity.

Inasmuch as this temporary plan of ranching is feasible on a small scale, I cannot conceive reasons why anyone, from a small beginning, should not be able to build a nucleus great enough to stock a good-sized ranch with breeders, and make the proceeds from sales of surplus animals great enough to finance the construction of a ranch under one of the aquatic plans explained in the foregoing articles.

CATCHING THE ANIMALS IN QUANTITY

The feeding should be done within the feeding pens each day about sunset. The food should be placed near the waters' edge at first, then it should be moved back gradually each day, until it is eventually placed in the corner farthest from the entrance; this brings a great number of the animals into the pen at the same time, making it a comparatively easy matter to trap them in quantity, by lowering the drop gate. The breeding stock may then be selected and released in proportion to about one male to every five or six females. If the males are in greater proportion they will fight fiercely, often killing one another, and becoming cannibalistic, especially if the food is short or not diversified.

Other pens of larger dimensions should be built adjoining the feeding pens, into which the animals may be driven, through a chute, so the drop gate to the feeding

pen can be raised immediately to admit other muskrats from the marsh while the attendant is selecting the desired ones from the first catch for breeding specimens or for pelting. In this way all animals may be corralled in one evening, proportioned to the necessity and released, because, if they are retained in these pens where they would be subjected to cold wintry winds for any length of time, they would soon become so chilled that they would die; sometimes within a few hours.

All muskrats that are brought in from the wilds should be retained in a small enclosure for a few days until they will stand on their hind feet and take food from the keeper's hand. If they are fed sparingly several times a day and not frightened more than necessary, they will soon become accustomed to being fed and meet the attendant with welcome recognition. Those born in captivity may be depended upon to be on hand at feeding time, or they will come as soon as they hear the attendant at the pens. The older stock are very sound sleepers, not easily awakened by noises during the day, but they are quickly aroused by the slightest sound at night.

Care must be taken to kill off all undesirable breeding specimens and surplus males about the first of March each year. All animals wanted may be taken unharmed, by means of the feeding pens; the attendant retaining the more desirable specimens for breeding purposes. The larger, darker, long built ones are by all means the better for this purpose, for the larger and darker these pelts are the better the price that can be obtained for them.

Crippled or steel-trapped muskrats must never be

placed in the enclosure with others until their wounds are thoroughly healed, because the physically able will invariably kill the weaker ones. If a muskrat is injured, only to the extent of having the tip end of its tail bitten off, it should be removed to seclusion until the injury is healed completely or the others will kill it. If one becomes pinioned in any way, as in a trap, and is heard to grunt, the others will be attracted to it and kill it as soon as they discover its helplessness. The grunt of the muskrat is very much like that of a small pig. They never squeal, as do house rats.

The general enclosure fence of a muskrat ranch should be patrolled each day to see that no animal is trying to dig its way into the ranch, or out of it. If evidence of either is found a box trap should be set to catch the culprit.

If it is a muskrat it may be released; if rocks are thrown in the excavation it will not dig there again. If it is a mink, retire it to one of the mink pens. If it is a weasel, or a rabbit, release it in the mink pen; the minks will attend to it at supper time. If it is a skunk, give it polite, respectful consideration, or else——!!!

NEST BOXES

Nest boxes for muskrats must be provided for each animal that is to be retained within the breeding pens, also a sufficient number to accommodate the animals within the main enclosure unless an adequate amount of hay is furnished them with which to build their own houses.

If muskrats are to be liberated in the developing pen during winter months these nest boxes must be prepared

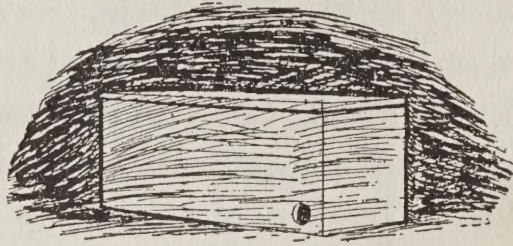
in advance, because the animals would die from exposure to the elements during the time that would be required to build their own houses for the needed protection. They would not hesitate to seek shelter in the artificially constructed dens in the absence of houses of their own design.

Muskrat dens should be about 12x12x12 inches square, inside measurements, with the double wall construction as described under the caption of "Animal Dens Construction."

These dens should stand completely in the dry, above the high water mark, to preclude possible inundation in the event of a freshet, but they should be within as close proximity to the water as would be deemed safe.

The entrance to these dens should be circular, about four and a half inches in diameter, and should be made through one side of the box, at one of the lower corners. All boxes should be well covered over with hay, grasses, etc., to give a natural appearance. The animals will sometimes dig an underground tunnel leading from the entrance of the box to deep water. Just prior to extreme drops in the temperature, muskrats occupying a box den will invariably stop up the entrance tightly with hay and dirt to exclude the cold air.

Except to discourage vermine, the interior of muskrat dens will require no attention from the attendant because these animals always deposit their refuse in the water, where it soon disintegrates and sinks; they never soil their dens.



Nest-box.

BREEDING

Muskrats are probably the most prolific fur-bearing animals known in the United States, with which there is fully as much to be accomplished through judicious mating, and breeding, as there is with animals of any other kind. The large, long jointed, darker specimens should always be retained for breeding purposes because these kinds are usually more generative than others. The male especially should conform to these requirements because the progeny will, as a rule, bear his lines and color-type to a pronounced degree.

If the darker, finer specimens of males are mated with females of corresponding types, the result will be, within a season or so, a superior strain of large dark muskrats that will command premium prices for their pelts, or bring specially good prices when the animals are sold for foundation stock, for these are the kinds that all ranchmen desire, and for which they would be willing to pay the price and dispense with the several generations of selective breeding that is necessary to develop them.

Furthermore, this system of selective breeding would result in the attendant's ability, within a season or so, to show to the fur trade a uniform collection of muskrat pelts such as have never been brought in from the wilds to any market and which would bring prices proportionately greater than the top market quotations.

Proper feeding and eliminated inbreeding would be largely responsible for the quality produced; all pens should be numbered so that the breeders may be shifted, systematically, to unrelated mates, which is not possible under Plan Number One.

Under this system of sectional breeding units the male should be kept in a pen adjoining each quartet of female breeders, and his pen may be not more than one half the size of that for the four females, but the pens are never too large; furthermore, muskrats frequently refuse to breed when they are kept in close confinement. As soon as the young begin to swim around and hunt for solid food, the male may be transferred over to associate with the females again for about fifteen days or until time for the new crop of young to arrive, when he should be removed to his own quarters where he cannot annoy the mothers with their newly born. Any tendency toward cannibalism within the breeding pens may be checked by placing a small amount of pork or fresh animal flesh of any kind within the pens at frequent intervals; bacon rind is also very good for this purpose.

Like all other animals of the fur-bearing family, the height of the breeding season for muskrats is in the early spring, but they breed, to some extent, during almost any time of the year. Young ones not more than five or six days old have been seen in their nests in February. Muskrats usually breed from three to five times a year; under this system of ranching it is believed that at least four litters may be averaged, in which the number of young would be from three to fifteen each, or an average of about eight.

The young of early spring will mature sexually, and bring litters in the fall of the same year in which they were born. The young in all mid-summer litters are considerably greater in number than they are in spring, fall or winter litters. All muskrats are born blind and hairless; their eyes open and they become well furred within eight to ten days, after which they will come out

to swim and to search for solid food. They mature sexually at about four months of age, when they will breed and bring their litters twenty-one days later. This breeding, however, would be out in the general enclosure where neither the parents nor the young would be under the attendant's control.

Some authorities claim that while the young are small, the male parent gathers food for the mother and carries it to her nest where she remains with her nude youngsters. However, close observations on the ranch have not developed any information to substantiate nor to disprove this claim; inasmuch as muskrats are polygamous animals that do not choose mates, such fatherly attention would seem unlikely, except, perhaps, within the breeding pens where he would be responsible for but four families, all in close proximity to one another.

As soon as the young begin to swim, the breeding system with the parent stock may be resumed. The young may remain with the mother until about the time for the new family to arrive, when they must be liberated within the main enclosure where the animals and their furs may be developed to surpass anything of their kind from the wilds.

Inasmuch as close confinement is not advisable for any animal, it is suggested that old breeders be exchanged for new ones at frequent intervals; this can be done as often as desired with muskrats, because of their frequent reproduction. This also relieves the strain of continuous breeding, making it possible to secure a large number of litters without placing the burden on the same set of animals for a strenuous period.

The young that are liberated in the lake in the early spring will bring litters in the late summer, but the

attendant will have no control over these litters until they are old enough to find their way to the feeding pens. They will prime in the late winter and be ready for market with the other crop. However, muskrats do not reach a "superior" prime condition until the second spring following their birth, neither do they attain full growth before that time.

Muskrat raising is a gold mine for anyone who will earnestly devote his efforts to its unlimited possibilities. The yearly production is enormous, and nearly all profit. The greatest obstacles to be met with in the undertaking will be in locating land that has the proper slope which would materially lessen the constructional expenditures, and in preparing artificial accommodations for the animals.

FEEDING

Muskrats are vegetarians. They live on grass, grass roots, water plants of all kinds, tender bark of twigs, small shrubbery, tender bark of small pine sprouts, alder or willow. They will eat almost any kind of vegetation that grows in the garden, as cabbage, lettuce, kale, potatoes, turnips, celery, parsnips, carrots, beets and their tops. They are also fond of onions, squash, melons, pumpkins, cantaloupes, wild rice, rape, wheat, oats, corn, barley, water lilies, cat-tails, grain chops, clover, alfalfa, clover hay, alfalfa hay, and all kinds of fruit, berries and nuts. They will also eat bread of any kind, or "Animal Biscuits," as described under that caption.

Green food may be given them during winter months; cabbage, kale, rape, etc., may be kept in the field in the usual way so it may be given to them fresh rather than in a wilted condition, but these must not be

given to them frozen. The frost in them will sometimes prove fatal, especially to the younger animals.

Where muskrats are closely confined in small pens, or in enclosures of any kind, they will frequently kill and eat their own kind if the vegetable food supply runs short or is not diversified. They have such ravenous appetities that when they are hungry it seems that they will eat whatever presents itself, and they are usually hungry.

They should be given at least four ounces of food a day in connection with a supply of clover or alfalfa hay which should be kept in their enclosure at all times if the natural vegetation is depleted. They are very busy little animals, throughout the entire night, nibbling on something or digging at the bottom of the lake in search of aquatic food which keeps them contented, and in good physical condition. They will utilize the clover, or alfalfa hay, in building their houses as the winter approaches, then, by degrees, they eat the house down and rebuild it, or as they eat it, they keep adding to it with other grasses.

A few lumps of rock salt should be kept in their enclosure, well back from the water, where they may have access to it when their systems require it. If a great deal of grain is fed to them as a constant diet for a week or two, some grease, as bacon rind, or lard, should be placed in their enclosure, that they may lick it occasionally, otherwise, in many instances, blindness would result from the constant grain diet.

I experienced two cases of blindness, simultaneously, after I had fed my muskrats on carrots alone for about three weeks. Whether the carrots, or the lack of variety was responsible for the predicament is not known; but

I have observed that where the animals have access to a diversified food allowance, all of their faculties properly function, and the animals remain physically sound and vigorous.

They seldom, if ever, come out of the water while cold wind is blowing, except perhaps for a moment, after which they will disappear again under the ice in search of food and remain there for several hours, only coming up for a moment at a time to get air.

When the wind is blowing, or in cold stormy weather, the attendant should throw the food into the water so the animals will not have to come on land to get it. If the water is frozen over, a hole should be cut through the ice into which the food should be thrown and pushed under the surface where it will not freeze, because frozen vegetation of any kind is injurious if fed to animals. The muskrats will come from their houses, under the ice, to procure the food.

A number of small holes about eight or ten inches square, or its diametrical equivalence, should be cut through the ice, in the immediate vicinity of the feeding place, and covered over with inverted boxes about the size of the ordinary fruit can crate. The animals will readily find these holes and proceed at once to daub the walls of the ice with mud and hay so the holes cannot freeze up. They will also line the walls of the boxes in a like manner to make them impervious to the cold winds of winter so they can use them for dining rooms into which they may carry their food to be eaten in the dry, and out of the wind.

In the event of a congested condition where some of the animals would be living in dens entirely upon dry land, and at a distance from the feeding-beds, the ice

should be kept broken at the edge of the water nearest to them, so that they will be able to enter it and make their way to the food through the water, as they always prefer to do.

For two or three weeks before muskrats are to be pelted for their furs, they should be fed liberally with carrots, or sugar beets of which they are specially fond. These are very instrumental in bringing out the fur, making it wonderfully silky, or glossy. Flax seeds also are excellent fur developers, but unless they are mashed up with other food these little seeds would be lost in the course of feeding.

CARING FOR THE YOUNG

As soon as young muskrats begin to eat solid food, they should be given vegetation, each day, that has been soaked in lime-water. The lime assures sufficient mineral substance in their systems to build big, strong bones, which constitute the foundation for superior stock. The mother should also have this lime-soaked food from the time the young are born until they are weaned to enable her to transmit it to them during the lactation period. Unless the dens become infested with vermin, the young will need no further attention other than the mother's own care.

KILLING, WITHOUT PAIN OR STRUGGLE

When the attendant wishes to gather his crop of muskrats, preparatory to pelting them, he will have no trouble in taking them in large numbers by means of the feeding pens. Then by driving them into the "Killing Box" as described under that caption, he can quickly dispatch them, without pain or struggle by the anaesthet-

ic method, as described under the caption of "*Killing Fur Animals.*" To kill them with a club would damage the furs considerably, and lower the sales value.

SKINNING AND CURING MUSKRATS

These animals should be skinned and cured, "cased," that is, with the fur side in, and they should be so shipped because it is in this manner that almost all fur buyers wish to receive them. The following is an orderly procedure:

Begin by cutting the skin of each hind foot around the ankles. Then slit down the outer inside edge of one hind leg to the base of the tail and completely around it, then up the other leg to the place where the skin is cut around the ankle. Now proceed to strip the pelt down over the carcass "glove fashion," using the knife only in places where it is necessary to cut ligament in order to free the skin from adhering flesh. Strip the skin down over the front legs in the same manner and cut it loose directly at the feet. When the ears are reached, be extremely careful to skin around them and cut away as much as possible of the thick part of the cartilage at the base of ears, leaving them attached to the pelt. Equally as much care should be taken in skinning around the eyes, lips, and mouth, so that all of the fur is removed from the animal's carcass without cutting or tearing it.

The pelts should then be adjusted to stretchers, over which they should be stretched not more than is necessary to prevent shrinking and wrinkling while they are drying. Then hang them in a cold, dry, shady place where there is a good circulation of air and let them remain there until they are well dried, when they are ready to be shipped. In shipping, be sure that they are

so bundled that the flesh sides of the pelts cannot come in contact with the fur of others, to soil them.

Neither salt, alum, nor solutions of any kind should ever be used in curing pelts.

The tails of these animals should be left attached to the carcass; they are worthless.

The nose of the pelts should not be stretched because the elongated nose is suggestive of southern stock.

DISEASES

No fatal diseases are known among muskrats. Blindness may occur if they are fed a continuous diet of dry grain. No cure for blindness is known, but it is easily prevented by diversifying the food, or if nothing but grain is available, place a little lard, fat bacon, or any kind of grease within the enclosures. The continuous grain diet will cause them to lick the grease, which prevents the blindness.

External Parasites—They are frequently infested with external parasites.

Remedy—Dip all breeders, as described under the caption of "Vermin on Animals." All young should be so dipped about twice in ten days, before liberating them in the main enclosure. Spray, or disinfect all dens at the same time that the dipping is done.

Another very effective way of ridding muskrats of vermin is to sprinkle about three or four gallons of kerosene over each acre of water in the developing lake, or marsh-land. The oil will remain upon the surface and accumulating around the edges of the shore, will be taken up on the furs of the animals and kill the vermin. The oil that they carry into their dens with their furs, will also destroy all vermin that might be within them.

The kerosene accumulating around the edges of the water will also serve to destroy and prevent mosquitos.

Dampness within the nest is not injurious to muskrats. The body heat of the animals seems to evaporate all moisture in the nest, within a remarkably short time.

THE FOX, IN THE WILDS

Foxes are native to almost every country on the globe, apparently thriving as well in the tropical forests of the equatorial zone, as they do in the barren, icy regions of the frozen north.



There are about half a dozen species of the fox family, comprising more varieties, and color phases, perhaps, than any other known fur-bearing animal. Their furs are made-up, disguised, and sold by the manufacturer under as many different trade names as there are species of this animal in existence. Many other furs of inferior quality are disguised to represent different kinds of foxes.

Foxes are by far the most sagacious of all fur-bearers, displaying remarkable shrewdness in devising ruses by which they may outwit their pursuers, or capture

their prey; their cunning is really uncanny, and has given expression to the well know comparison "sly as a fox."

Foxes in the wilds usually den in pairs, male and female. When the male goes out in search of food, his



"The Sly Fox" in ambush.

mate will remain at home. Should he be chased by dogs while on his quest, he will circle the den at some distance from it until, becoming tired, he will run home for a rest. As he enters the den his mate will run out immediately and back-track him for some distance, leading the dogs away from the den by circling in another direction. Through this relay system they will eventually wear out the dogs; then the one that is out will return to the den after all signs of danger have passed. In this way, they avoid disclosing the location of the lair. If there is a hollow log near their den, the remaining fox, on hearing its mate being chased, runs out to the log which they

will use for the relay station. When the pursued mate runs into it, the other one will immediately run out to be chased, never going near their den until the dogs have discontinued, and when all signs of danger have disappeared. They will then return home together, trium-



The designing fox outwits its pursuers.

phantly. This relay system gives each fox its turn to rest, while the dogs are kept on a continuous run—soon wearing themselves out.

If there is a steep embankment near, the pursued fox will run straight up it, as often as he can get around to it, because he is smart enough to know that the dogs cannot run up a very steep incline. In this way, the crafty little fox will so discourage the dogs that they

will soon give up the chase in despair, then the victorious fox may return home with reasonable safety.

On a number of occasions, a fox had been chased by hunters, with hounds, when in each instance, the animal would disappear in a little valley, as mysteriously as if



The cunning of the fox is uncanny.

it had vanished through the trackless realms of space, and the dogs could scent no further trail of it. This weird disappearance of the designing little animal soon became the topic of the community; eventually a sentinel was stationed in seclusion near the point of disappearance, and the chase was renewed. The sentinel discovered that the fox made a running leap, sprang to the low hanging broken limb of an old tree, ran along the

limb to the trunk, then out on another limb extending slightly over a fence to which it jumped, and ran along the top rails until it reached the point of a precipice around which the fence was built. Leaping to a little ledge of rock on the steep walls of this precipice, it soon secluded itself in a crevice among the rocks, to where the dogs could not climb.

This bit of ingenuity threw the dogs completely off the trail, because they could not traverse the fence rails in search of it.

While the instance just related cannot be vouched for in its entirety, it is unlikely that the narrative would be questioned by anyone conversant with the elusive cunning of this crafty little creature.

I have had considerable experience hunting "big game" in the far west, and in trapping, to some extent, in the upper Great Lakes region, especially in catching fur-bearing animals "alive" for breeding purposes, but I am not a trapper, nor do I pretend to possess any greater knowledge of the subject than that acquired through reading many articles written by those skilled in the craft.

In practically all of these articles written on fox trapping, I have read that these sly little animals will not enter, or approach a trap that has been handled with the bare hands because of the remaining odor of man which immediately arouses their suspicion and warns them to avoid the vicinity.

This opinion runs concurrent with woodsmen of keener perception who have devoted many years of labor to the trap line; though my personal experience in trapping is insufficient to add any weight to this general belief, my observations have not developed anything to

substantiate it, nor to disprove it. A short distance from my experimental ranch in the Ozarks, there was a den of wild red foxes at the foot of a mountain; on many occasions I was awakened just after day break by their little puppy-like barks as they made strenuous effort to gain entrance to the rabbit enclosure for an early morning's breakfast. Upon arising and watching them from a window in my little log cabin, I noticed them trying to get in through a gate, through which I passed several times each day. Also, they would frequently jump upon the box where I sat every morning, noon, and night, while watering, and preparing food for my animals. This position on the box enabled the foxes to see the rabbits more plainly over the eighteen-inch wall around the bottom of the wire fencing. Also, in coming and going, these foxes would use the same narrow foot path, seemingly without concern, through the heavy bed of clover, over which I had trod many times a day. Furthermore, it is not an established fact that foxes are provided by nature with a sense of smell to enable them to determine the recent presence of man, as some dogs can do.

It is at least known to many of us that neither foxes, nor any other fur-bearing animals seek their intended prey by scenting the trail. They chase it by "sight only," exactly as gray-hounds do; when they lose sight of their prospective victim they immediately discontinue the chase. But they can detect the odor of fresh blood or of fresh meat, in the air, for quite a distance, as man can also do.

While foxes, in the wilds, seclude themselves during the day, it will be observed that those raised on the ranch are as much diurnal as they are nocturnal in their habits.

THE BLUE FOX

The Blue Fox, so called because of the almost solid dull bluish tint of the pelage, is a very beautiful animal producing a fine fur of considerable importance to the fur trade. This animal's natural range of distribution is mostly from northwestern United States northward through British Columbia, Alaska, and to the Arctic Circle, but recent experiments prove that it will thrive and develop its normal coat of fur in any cold climate. It is reputed to be extremely prolific, easily domesticated, and is not so encumbered with that detracting nervous temperament which so characterizes the silver fox.

The requisites for raising this animal would be the same as for any other member of the fox family except possibly to meet some slightly varying peculiarities common to the species, which would be observed readily by the ranch attendant. While this animal, heretofore, has lain in the background, it is now coming forward as a fur producer and its real value is gaining considerable recognition among breeders of fur-bearing animals.

THE DOMESTICATED SILVER-BLACK FOX

So many voluminous articles have been written, from time to time, with reference to the evolution of the silver fox industry that to rehash it here would serve no useful purpose. However, it may be stated, truly, that every page of the history of this unique industry is as intensely interesting as would be the climax to a romance in fiction.

Silver fox raising as an industry had its origin on Prince Edward Island, Canada, where, starting with

but two pairs as a nucleus it has developed into one of tremendous proportions, with something more than \$16,000.000.00 represented in the business; from this industry the Island now receives the greater part of its revenue.



Probably no industry that sprang into prominence within the past few years has attracted such world-wide attention as has the domestic propagation of silver-black foxes. In spite of strenuous efforts of pioneer fox raisers to suppress its infinite possibilities, the industry has grown tremendously, reaching to all provinces of the dominion until it is now probably paying greater annual dividends on the investment than any other branch of the agricultural business. It is also well established over the northern tier of states in this country where it is growing rapidly.

Michigan probably leads the States in the fox raising business at present, the greater part of which is in Muskegon County. There are about five hundred silver fox

ranches in the United States, on which there are from 12,000 to 15,000 foxes, representing a total valuation of \$8,000,000.00. There are many other ranches throughout the country in which indeterminate amounts are invested in fur ranches where efforts are applied to the different kinds of fur-bearing animals.

The commercial importance of fox raising in the United States has prompted this government to send out specialists who study, and further the interest and development of the business in this country.

The common red fox that is native to nearly all parts of the world, and the silver-black fox of northern North America are believed to be the same animal, differing only in color type. A white band forms around the glossy guard hairs of the black fox, just below the tip ends, causing a frosty effect, from which sprang the appellation "silver-black fox."

The silver fox is unquestionably a freak off-spring of the red fox, just as any contrasting color phase appears at times in the animal kingdom from normally colored parentage, caused by imperfect pigmentation.

Occasionally, in a litter of wild foxes, there will be a black one, while all of the others would be of the usual red-fox markings. This distinctive color phase, of the one, is probably due to inbreeding, causing a defective, or abnormal physiological activity intensifying the pigment in the skin, to which the color of the guard hairs correspond; exactly in the reverse condition, the physical inactivity of the pigment would cause albinos, occasionally, in both man and beast from apparently normal parentage; as, white coons, white rats, white mice, white squirrels, white rabbits, white black-birds, white peacocks and albinos in mankind; all of which have pink

eyes, caused by the absence of coloring which leaves the blood capillaries in the pupil exposed to the light; causing considerable discomfort on bright sunny days.

The present strain of silver foxes was produced through scientifically breeding the blackest, to the blackest, until the red color phase became so completely eradicated from the blood of their progeny that they now breed true to color; occasionally from the litters of some poorly bred black foxes of unknown parentage there will appear some red, or rusty colored ones. This occurs, of course, only in cases where the red phase was not properly bred out of the parent stock. This presents a fair example of one of the reasons why a prospective fox raiser should be sure that he is buying only the best of animals for his foundation stock, and only from an established reputable ranchman who is a member of one of the Fox Raisers Associations and in good standing. He would help his customers to certain success. The associations demand that their members treat customers fairly. *While the best quality foxes are expensive at the start, they are by far the cheaper kind.* Do not be talked into economizing at the sacrifice of *quality* which is the one thing that will surely prove its worth long after the raiser has forgotten the original cost of it.

RANCHING

Although silver fox pelts may be taken at almost any time during mid-winter and be classed as "prime" there is a short period of perhaps not more than ten to fifteen days in which they are at the pinnacle of elegance. After that time, they become over-prime from which they lose much of their lustre. A little experience on the part of

the attendant will soon enable him to determine when they are at their best.

The silver effect in black foxes is most prominent just over the hips, or hind quarters. Sometimes it extends well up over the shoulders with a detracting effect, because too much silver scores unfavorably with discriminating buyers, as does too little of it. There seems to be a concensus of opinion among professional judges, that foxes showing about one-third of their pelts silvered, present the better effect.

This silver effect is caused by a white band that forms around the guard hairs, about a quarter of an inch down from the tip ends, and showing just beneath the otherwise glossy, raven black tips, gives these pelts that beautiful frosty tinge which manufacturers cannot successfully imitate with inferior furs by the dyeing process. Usually the jet black bushy tails of silver foxes are beautifully contrasted with a snow white tip.

The present strain of Silver Foxes, produced through scientific propagation stands pre-eminent over their kindred in the wilds. The finest fox furs in the world now come from the ranches, bringing fabulous prices. When they are properly silvered they bring prices much higher than at any other time during the course of their development.

So desirable are these pelts, that they have recently been sold at prices prohibitive to average persons. In some instances they have sold as high as \$2,600.00 for a single skin, but this is exceptional and the fox raiser could not hope to maintain such an average. Yet they are, and probably always will be at a price far in excess of the cost of production, leaving the raiser an extremely broad margin of profit on which to operate.

There is always a demand for live foxes for foundation stock some of which have been known to bring as high as \$32,500.00 for a pair. Such prices, of course, are as rare as are the specimens that command them. The average sale price for high grade breeders would probably be around \$2,000.00 a pair. The finer specimens would bring a little more, perhaps, while the less desirable ones would not bring so much. If the ranchman hopes to maintain an attractive average for his breeders, the parent stock must be of high grade ancestry.

It is not believed that silver fox furs must be produced on Prince Edward Island to procure the highest degree of elegance; neither do the finer specimens of foxes, for breeders, necessarily come from there; the industry has, thus far, reached its highest state of development on Prince Edward Island, therefore those who are in search of breeding stock naturally look there for their wants because "Prince Edward Island" has become synonymous with fox raising, to persons familiar with the industry and it is, in reality, the home of the fox raising business.

The State of Michigan is next in order, claiming to produce as fine specimens of silver foxes as are to be found elsewhere, which they claim to have proved by the decision of judges at the Silver-Black Fox Exhibition held at Muskegon in 1921 where about two hundred and thirty two foxes scored a high average.

The present strain of silver-black foxes is a direct result of several generations of scientific propagation by which they were developed into really "domestic animals," however, in spite of these several generations of domestication their distrust of mankind has waned but

little. Even when the young are taken from the mother immediately after birth and fostered by a nursing cat, as is often done, they will remain shy, nervous animals, forever distrustful of man, especially around mating time, or while their young are small.

Silver-fox ranching is now a well established business in which many have met with success far beyond their expectations. There are some fox ranches in America that are reported to be capitalized at half a million dollars, operating successfully on a gigantic scale. However, a ranch may be started with only one pair of foxes, then by exchanging sexes with some other raiser, inbreeding would be avoided. In this way the ranch may be developed into large proportions within a very few years, provided each season's production is retained for multiplication. The third or fourth year's compound is enormous, (see Table of Animal Increase).

The ranchman should always start with the best quality of breeders obtainable if he expects to meet with the best results. He must give special attention to the equipment of his ranch, and to the suitability of the dens, as well as to the care of his animals; all of which contribute directly to the ultimate results of the undertaking.

Close observation will disclose to the attendant many little ruses ingeniously designed by the foxes to mislead him, particularly around their whelping time, and while the young are small. He should feign being deceived, for to let them know that their little tricks have been discovered, would tend to intensify their characteristic feeling of doubtful safety for their young as well as for themselves.

Fox raisers of today designate these animals as "dog"

(for the fox) "pups" (for the cubs) and "fox" (for the vixen). These animals are not dogs, any more than are cats, neither do they belong to the canine family, yet, common usage is indeed difficult to overcome.

In recognition of, and with due respect for the dignity and preeminence with which silver foxes rank in the world's markets, fox raisers should refrain from crumbling that throne of supremacy by classing their fine silver foxes with common dogs. This ironical classification is fully as inappropriate to foxes as it would be to liken a fine diamond to a piece of ordinary glass, for either of them are cheapened by the comparison—the psychological effect is the same upon both.

Foxes produce fine furs in resplendent beauty without a peer, while dog's hair at its best, is worthless. It will be observed in subsequent pages of this book that, contrary to present custom, but out of respect for the majestic splendor in which silver fox furs "stand out" in the fur world, the animals that produce them are designated in terms of their inheritance, as, "Fox" (the male.) "Vixen" (the female.) "Cubs" (the young.)

LOCATING THE RANCH

The ranch should be located in a well drained place, free of either clay, or limestone. A sandy surface is preferable, and it should be located where the foxes will be spared the nervous strain occasioned by unusual noises, and not be excited by strange moving objects, or playful boys; they should be kept as secluded as possible, though the general routine of traffic along a highway at a reasonable distance does not seem to have any particular effect on them, therefore inconvenient isolation in the recesses of a forest is unnecessary.

A number of young trees, with some shrubbery, such as hop beds within their enclosures would add considerably to their comfort and contentment, although many successful raisers have the ranch located entirely in the open, apparently without ill effects.

Wherever it is possible, mulberry trees and elderberry bushes should be planted in all fox pens; these supply much of the needed shade, and furnish an abundance of berries, which the animals like. These berries also lend much of the needed diversification to the daily food allowance, throughout the summer months.

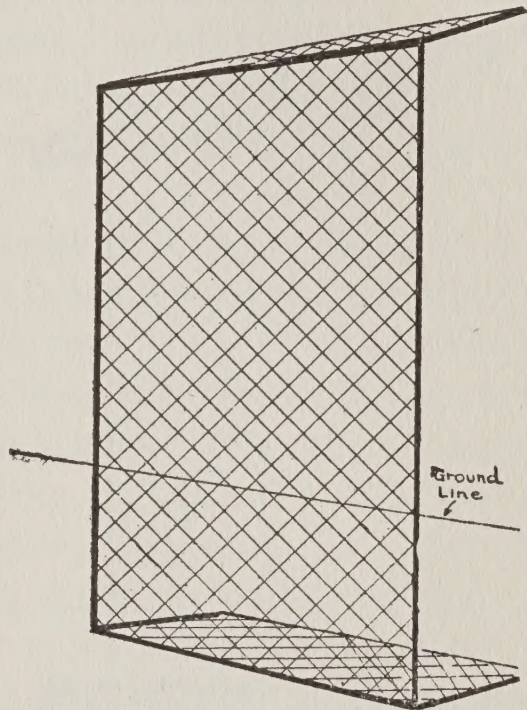
Every fox pen should be so constructed that each part of it will get some sunshine every day; by this means thousands of disease germs will be destroyed through its powerful disinfecting qualities; also foxes delight in an occasional sun bath, which is quite beneficial to both the animal and its furs.

ENCLOSURES

There are quite a number of plans for constructing pens for foxes; one probably as good as another if it properly retains the animals under favorable conditions. The fence for these pens should be about eight or nine feet high and built of mesh wire to permit of good circulation of fresh air at all times, and to guard against the possibility of snow banking up against it high enough to afford an avenue of escape over the top, as might be the case with a board fence. These pens are frequently built about 25x50 feet, requiring one roll of mesh-wire to surround each enclosure. Some make the pens larger, while others make them smaller, but if they are larger, the animals confined to them would unquestionably do better.

It is sometimes necessary to separate the fox from the vixen; for this reason each pen should have an adjoining compartment about 25x10 feet, or larger, into which the fox may be driven when it is necessary to seclude him. This form of construction is explained and illustrated under the caption of "General Fence and Pens Construction."

Some ranchmen sink their fences underground about four or five feet, with a two feet wide turn-in at the bottom. If the trench is sunk to hard earth, with the wire extending a few inches beneath hard soil, the turn-in will be unnecessary, because foxes will not dig through hard earth to escape. Others do not sink the fence at all, but lay a three foot wire turn-in on the sur-



Underground turn-in.

face, thoroughly intersecting with the wall fence, well penned or staked down along the extending selvage, after which it is covered with dirt to prevent the foxes' feet from becoming sore from running over it. It is their nature to run, at all times, nearest the fence.

When foxes are frightened they will climb a mesh-wire fence readily, so that a turn-in about two or three feet wide must be adjusted around the top of the fence to prevent them from climbing out. This turn-in should not be more than about seven feet from the ground be-

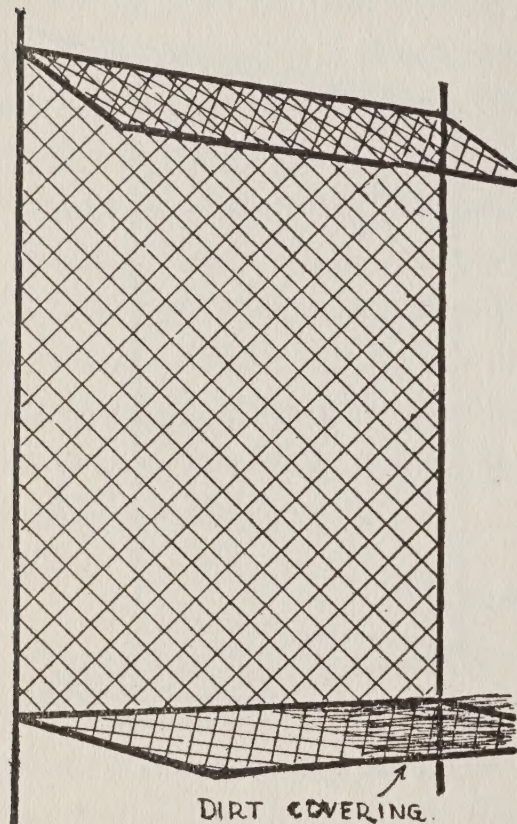
cause foxes will climb the wire but they will not descend it; when they get as high as the turn-in will permit, they will fall back to earth.

All sharp sticks, stubs, rocks, and other objects should be removed from around the walls of the enclosure, so that when the foxes fall from the height to

which they have climbed, they will not injure themselves by falling on them.

Where the turn-in mentioned in the foregoing paragraph is not more than seven feet from earth, there is danger of snow banking up, offering a means of escape over the top, therefore the absolute necessity of a general enclosure, or guard fence, around the entire ranch.

For economy, the pens may be made of two sizes of mesh, the section intersecting with the earth should be of sixteen



Top and surface turn-in, with a little loose dirt thrown over the surface wire for protection to the animals' feet.

gauge, one and one-half inch mesh galvanized wire, about twelve inches wide, to prevent young foxes from escaping through it, or from getting their heads hung in it. The remainder of the fence may be of two inch mesh, of the same gauge as the other. The turn-in may be of ordinary chicken wire.

Some fox raisers cover the pens over completely with

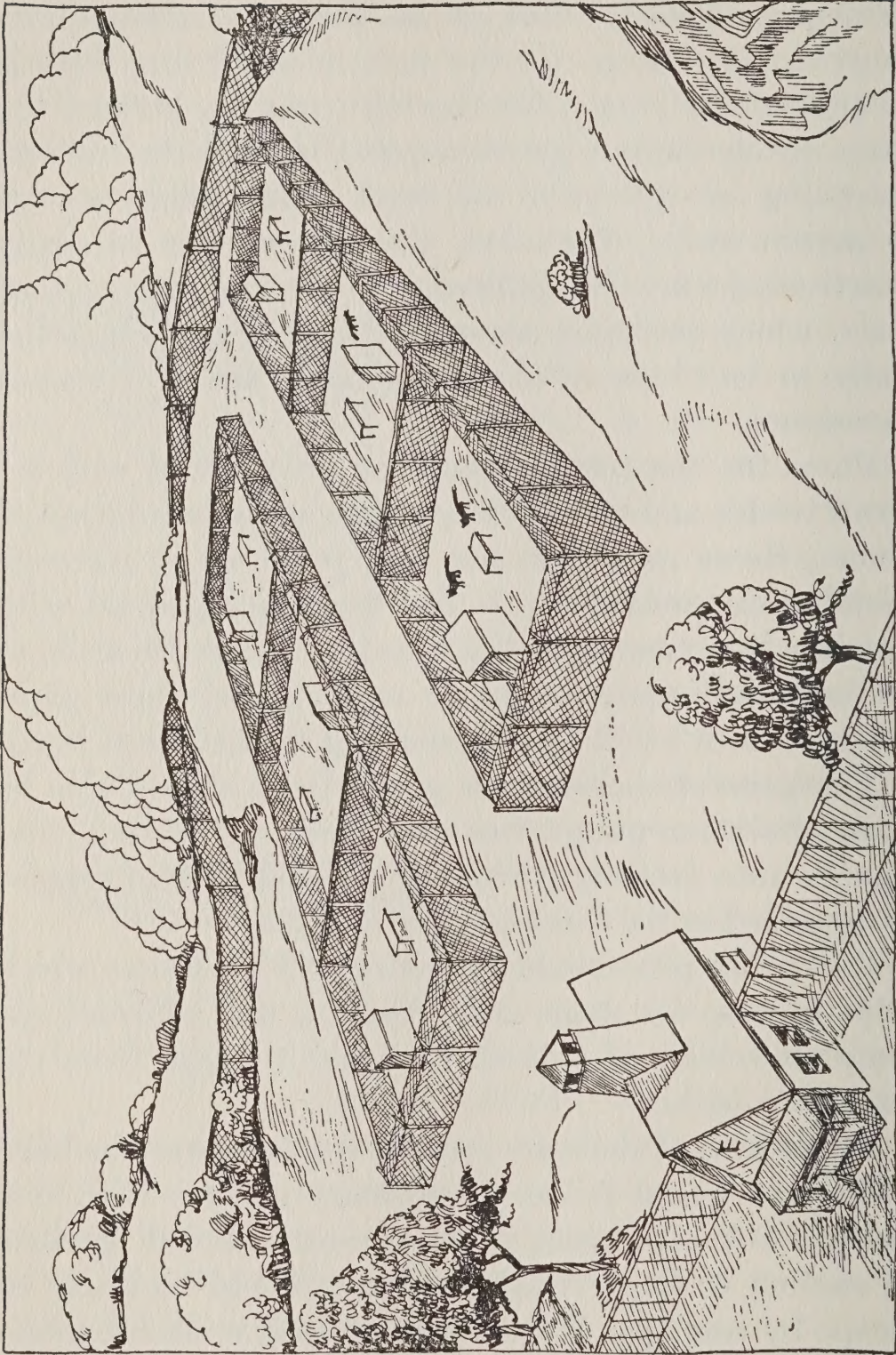
ordinary poultry wire, in which case the top turn-in may be dispensed with. But, if the pens are substantially constructed with an effective turn-in at the top, there is no perceptible reason for the top covering, because the foxes surely cannot get to a point beyond the turn-in, excepting in the event of snow banks high enough to permit of it. However, the covered pen is easily constructed and the difference in expenditure is very little, which probably accounts for this custom, especially in localities where deep snows are of frequent occurrence.

Posts for the fences should be strong and well set about twelve and a half feet apart to assure a substantial fence. Some ranchmen use iron posts set in concrete foundations, sunk four or five feet underground with iron brackets to support the turn-in. Inasmuch as there are no fixed requirements for constructing these pens, the ranchmen build them according to their own ideas.

The general enclosure or guard fence should also be made of sixteen gauge, two inch mesh, galvanized wire, eight or nine feet high, with the top and bottom turn-in as described in the foregoing paragraphs.

Every fox pen should be within this enclosure which helps to keep out dogs, and intruders, and prevents the complete release of animals that might escape from the retentions within.

Regardless of the success of some ranchmen who have built these guard fences of ordinary chicken wire, one and one-half inch mesh, it is not recommended, because an excited or badly frightened fox would be likely to escape by tearing a hole in wire of such weak construction. The small amount saved through the difference in cost of these materials is not worth considering when



A fox ranch with its component parts complete for producing furs under the semi-natural plan.

weighed with the value of the animals that would be prevented from escaping through the adequate protection provided by the better material. If it is necessary to economize on the guard fence, nothing less than an eighteen gauge wire should be considered.

Silver foxes are such valuable animals that whatever might be expended in necessary preparation for their keep and care could well be considered a judicious investment. Any manner of construction, for the sake of economy, that might prove inadequate to the essentials, would be folly.

To economize, the pens may be built in sections of three or four. In all cases where this is done, the partition walls between pens must be of a mesh not greater than one inch as far as the turn-in, so that a fox's foot would not pass through it; when an animal is climbing the partition wall, some foxy neighbor in the adjoining pen might grab its foot, pull it through the mesh and probably so lacerate it that amputation would be necessary to save the animal. Serious damage in this way has been of such frequent occurrence that many ranchmen have been prompted to build each unit separately, with an alley about five or six feet between them; this method is also instrumental in preventing the communication of disease.

Close observation by experienced attendants does not disclose treachery, or any particular antagonism between foxes in adjoining pens; nevertheless, one will surely pounce upon its neighbor when he catches him at a disadvantage, which they recognize very quickly. This same cowardly characteristic prevails in all kinds of wild animals, exactly as it trickles through the veins of lowly members of mankind to kick the underdog. In fact, it

seems as if some animals have not yet reached a standard of civilization far above that of some men.

A short piece from the trunk of a large tree, with stubs of limbs projecting, is a welcome adjunct to a fox pen. They like to jump on it, where they curl themselves up on the flat end of the projecting stubs, often remaining there throughout the entire day. The cubs, especially, like to run up and down these stumps, from which they get a large part of the exercise so necessary to their development.



A welcomed addition to fox pens.

An observation tower, or some place from which the attendant may watch the foxes, without their knowing it, is an addition to a fox ranch meeting so many needs that too much importance can not be attached to it.

From this tower the animals may be watched constantly during the breeding season, enabling the attendant to determine which ones have bred, which ones have not and the reasons why. As a rule they will not breed if they are conscious of being watched, or if otherwise apprehensive.

If possible, this observation tower should be built on a cliff, or on an elevation much above the general level of the ranch, so that the attendant may enter the tower from the opposite side unobserved; the human scent, if any, would be carried above the animals so they would not suspect his presence in the vicinity. Foxes appear to be undisturbed by noises that come from above them.

If the ranch is located where the land lies level, it will be necessary to build board walls between the tower and the pens so the attendant may enter unobserved. Foxes never conduct themselves in their natural way if they suspect the presence of any one in the immediate vicinity. It is from some point of seclusion only that the individual characteristics and disposition of each animal may be accurately determined.

I recently visited a fox ranch in Ontario, Canada, where the loft of a barn was used for a watch tower. This ranch being located immediately back of the barn, the attendant could enter the tower from the opposite side entirely unobserved by the foxes. There was a small slit through the wall in this barn loft where the attendant, sitting on his chair, could see every pen in his ranch, record the day's events at breeding time, and observe the attitude of all mother animals, especially while the young are small, before their eyes are open, for the time intervening in which the cubs are blind is unquestionably the crucial period.

The cost of constructing a ranch of twenty-five pens, including dens, guard-fence, watch tower, etc., would be, at this time, approximately \$2,500 or an average of \$100.00 a pen. If a ranch with a less number of pens is built, the average cost would probably be a little more than \$100.00 a pen, because the cost of erecting the watch tower would be the same whether one or more pens were built.

The wire for constructing these pens comes in rolls of 150 feet each. For economy, different sizes and different meshes of wire may be used. As a rule the more successful ranchmen use the sixteen gauge throughout, except that for the top turn-in, or for top covering,

where the regular twenty gauge two-inch mesh poultry wire answers all requirements.

Where one wishes to economize in the pen construction, the following compilation would assist in meeting the requirements for a ranch of twenty-five pens—25 ft.x50 ft. each, with a six-foot alley between each pen.

Twenty-five rolls sixteen gauge one and a half inch mesh, four feet wide, for first section of wall, to extend one foot above ground, or, if layer wire is used instead of ditching, then twenty-five rolls one and a half inch mesh, twelve or eighteen inches wide would do.

Twenty-five rolls sixteen gauge two-inch mesh, three feet wide for bottom turn-in, or layer wire. Twenty-five rolls eighteen gauge two-inch mesh, six feet wide for upper section of wall, forming a fence about seven feet high.

Thirty-one rolls twenty gauge two-inch mesh, three feet wide for top turn-in for pens and guard fence.

Six rolls eighteen gauge two-inch mesh, three feet wide, for layer wire, or bottom turn-in around guard fence.

Six rolls eighteen gauge two-inch mesh, four feet wide, for lower section of guard fence.

Six rolls twenty gauge two-inch mesh, four feet wide, for upper section of guard fence.

The railings to which the wires are to be stapled must be placed where the edges of the different sections will meet; otherwise, the sections would have to be laced together with wire, requiring considerable time and effort. This arrangement of railings would also make a more substantial fence.

This estimate includes building a guard fence 250x350

feet by about eight feet high. If the pens are built in units of five, with sides adjoining, considerable wire and labor may be saved. However, the more successful ranchmen do not recommend this system, but build them separately as a rule.

If the ranch is established in a locality where there are heavy snowfalls, each pen should be covered completely with twenty gauge two-inch mesh poultry wire to prevent foxes from escaping over the top when snow banks high enough to permit of it.

The sixteen gauge one and a half inch mesh wire mentioned in the second item, extends from the bottom of the trench to about one foot above the earth's surface to prevent very young foxes from crawling through or from hanging themselves by getting their heads fastened in the mesh, which would happen if the mesh were larger. They are extremely mischevious little creatures, always in trouble.

While I do not know that an octagonal pen has ever been used for foxes, it would seem to be the better kind, for a number of reasons. Foxes would not be so likely to climb the walls, from which they invariably fall back to earth, frequently breaking or spraining bones, for it is usually in corners that they attempt to climb.

Where the pens are of octagonal construction the youngsters will not rush against the wire of an intersecting wall in their playful pranks while chasing one another around the pen, when the inclination is to run mostly alongside the walls. These pens would also serve to prevent communication of disease and parasites to the inmates of nearby pens, because the animals would not be in such close proximity to one another. While round pens would offer additional advantages,

they would be more difficult to construct, and more expensive.

DENS

(The Most Important Constructional Requisite)

Ever since the beginning of the fox raising industry, the proper construction for dens has been the momentous question with all that are engaged in it; this subject remains today, unquestionably, the most important constructional problem to be solved in successful fox raising; and probably so for fur-bearing animals of any other kind.

All foxes in the wilds do not build their dens alike. The reason why they construct them differently at points diversely, is but another question in the strangeness of wild animal intuition that science is at a loss to understand. Some foxes have two entrances leading to the nest, permitting both ventilation and drafts, while others have only one entrance which admits of neither. When there is only one entrance, it is possible that all foul air is consumed by the soil, and that all exhalations are immediately oxygenized by direct contact with the earthen walls of the dens; but, in the event this is not the case, then neither drafts nor ventilation could be a decisive factor in fox dens. Yet nearly all successful fox raisers insist that the dens must have ventilation and must not have drafts. Whether this contention is right or wrong, it offers an abundance of food for thought to be weighed with a full measure of reasoning.

To facilitate handling ranch-raised foxes it is necessary that they live in artificially constructed wooden dens, as mankind lives in houses; therefore, it is reason-

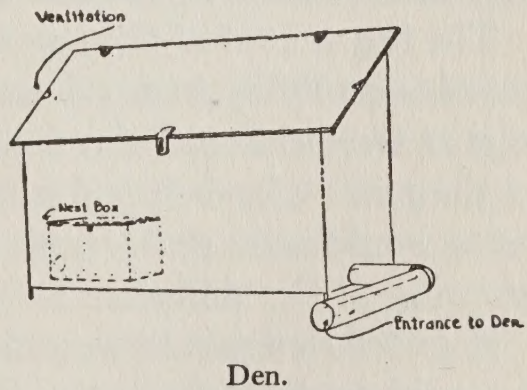
able to suppose that the basic laws of scientific hygiene are as beneficial to foxes as they are to man; then we must believe that, in constructing these dens, the ranchmen have followed along scientific measures and established precedents conforming to hygienic suggestions. Theoretically, they are right, so to that end this article shall be specifically directed.

There are probably as many plans for constructing these dens as there are ranches in existence. Many of them have been tried out, from time to time, with varying results.

Whether the ultimate results should be attributed to the plan of den, or to the capability or incapability of the attendant, is problematical, but it is my opinion that they are largely, if not wholly, contingent upon the combined factors, rather than to either, specifically.

If the attendant desires to build the dens according to his own plan, he should bear in mind that they must be dark, dry, warm, properly ventilated and free of drafts. They must give the foxes a feeling of perfect seclusion, in which the mothers, with their cubs, would feel a keener sense of safety, because they are very nervous when they feel that their hiding place has been discovered by the attendant, especially while the young are small; the more they are made to feel that their den is completely hidden, the more contented they will be.

A good plan for a fox den is shown in the accompanying illustration. This box should be about thirty-six



inches wide, forty-five inches long and thirty inches deep, inside measurements. It should be made with double walls with about six inches of space between them, or in the manner of a box-within-a-box, as illustrated and described under the caption of "Animal Dens Construction." The remaining space should be filled in with saw-dust, or with some substance of low thermal conductivity for coolness in summer, as well as for warmth in winter, precluding the possibility of extreme eventualities in either instance. Ground cork, such as Malaga grapes are shipped in, is probably the better material for the wall filling. If the cork is difficult to procure, the attendant may safely resort to saw-dust.

The floor of the box should also be double and filled in in the same manner, with a layer of tar paper carpeting the lower section to preclude the entry of moisture from beneath. The box should stand on legs raising it about ten inches off the ground to help keep it dry, and to make it possible for the foxes to crawl under it where they can lie on cool soil during the heat of midday.

The top or roof of the box should be of solid hardwood boards absolutely impervious to water, with small openings at the gable ends for ventilation. The slight incline of the roof is for better drainage. The busy little creatures would soon create leak holes in a shingled roof by gnawing at the shingles.

A metal roof would be undesirable because of the heat it would contract from the sun of mid-summer. Foxes are very fond of curling themselves up on these boxes where they frequently remain for hours, keenly observing all that is going on in the vicinity. Their curiosity is so immeasurably aroused by every moving object that nothing escapes their closest scrutiny.

The entrance to this box should be through an elbow chute, which faces the south. The long arm of the chute should be about five feet in length; the short arm about three feet. The passageway through it should be about eight inches wide by ten inches deep, inside measurements. The inside corner, at the intersection of the two arms, should be well rounded and sand-papered, otherwise the animals would damage their furs considerably by scraping their sides against it when making a hurried entry or exit. For this same reason all entrances should have the corners well beveled and sand-papered.

The nest box, which is to be placed inside of the den, may be made of ordinary box material. Its walls should also be double, with about three or four inches of space filled in as described in the foregoing. The inside dimensions of the nest box should be about sixteen inches wide, twenty inches long by sixteen inches deep; the bottom should be slightly pan shaped to cause the cubs to roll inward instead of outward. Should they roll from under the mother and become chilled they probably would die.

All edges or corners around the inside of the nest box where the sides and bottoms intersect, should be well stripped with molding so there would be no remaining ledges above the concave portion of the nest on which the cubs might lie from under the mother.

The lid of this nest box should be hinged, so it may be looked into and disinfected; there should be about one quarter of an inch space between the lid and the box, at each end, for ventilation. The entrance to the nest box should be about eight inches wide by ten inches high; it should begin about three or four inches up from the bottom, leaving a little barrier there to prevent the cubs

from crawling out before they are able to return without the aid of the mother. A piece of molding should extend across the outside end of the nest box, directly beneath the entrance, forming a gradual incline so that in the event the cubs do crawl out, they will not encounter a barrier when they attempt to return to the nest, and the mother could then drag them in more easily and with less danger of injury than if the incline were not provided.

The nest should be placed in the den against the south wall, with the entrance in the end farthest from that end of the den to which the chute is adjoined; or to be more explicit, if the chute is adjoined to the west end of the den, then the nest box should be placed alongside the south wall, with the entrance to the nest facing the east, excluding all light from the nest. The long arm of the chute could then have the entrance to it facing the south, as the animals always prefer to have it.

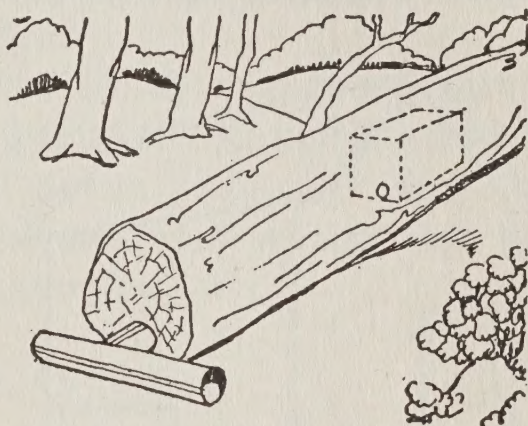
By virtue of the same line of reasoning it is fair to presume that complete darkness within the nest box is as necessary to successful fox raising as it is to mink raising, for it is certain that the mother fox feels a keener sense of safety for her cubs if she does not see daylight from within the nest box; it is well known that even our domestic animals are more contented when they feel that they are in perfect seclusion with their young.

The remaining space in the outer box affords a good circulation of fresh air, and provides an inside runway for the cubs before they are brave enough to face the outer world.

A very desirable yet inexpensive den for foxes is improvised from a five or six-foot section of hollow log.

The nest box should be placed back against the closed end of the log, with the intervening space filled in as described under the caption of "Animal Dens Construction." The entrance to this box should face the chute, which may be "T" shaped, or it may be as described in the foregoing paragraphs built to exclude light from the nest. A well fitted door should be at the closed end of the log to permit access to the nest by the attendant. The door must exclude both wind and water.

A barrel-within-a-barrel, with the intervening spaces filled in, also makes a very desirable den for foxes. The chute entrance and all other adjuncts may be in keeping with the foregoing specifications.



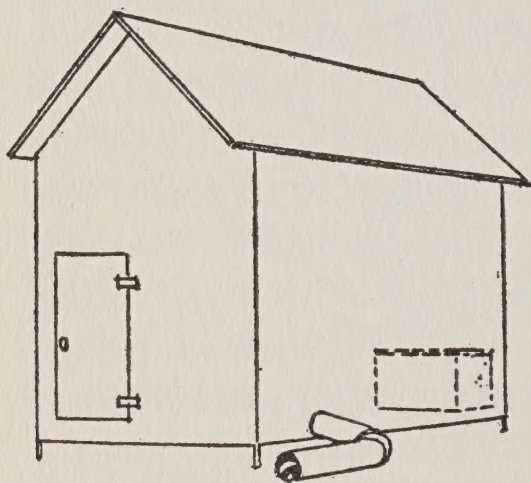
Den improvised from an old log.

Two dens should be in every fox enclosure, one each of the kinds described here would probably be as good as any others. The reasons for providing two dens in each enclosure will be found in pages that follow.

Some attendants build a small house with a door large enough for them to enter it. The chute, inside nests, boxes, etc., should be constructed exactly as described in the foregoing paragraphs. The wall construction to both the nest box and the building should be as described under the caption of "Animal Dens Construction." The advantage of this arrangement is that, inasmuch as all feeding, watering, etc., would be done on the inside of the building, and as the adult foxes run outside when the attendant enters, it leaves him free to look into the

nest, count the young cubs, etc., unknown to the mother.

In no case must he ever put his hands on or inside the nest box until after the twenty-first day, or until the cubs have their eyes open. If there is a dead one found within the nest, it must be removed with a hook attached to the end of a stick; the attendant's hands should never touch that part of the hook that enters the nest because of the possibility of leaving a human odor that might arouse the anxiety of the mother for the safety of her cubs. The lid of the nest should be lifted with the hook; not with the hands.



The House Den.

Some successful fox ranchmen build the dens entirely outside the pens, with a shute leading to them through the walls of the fence. In this way the attendant may do all watering and feeding inside the dens, without entering the pens.

With this arrangement the dens should have double doors; the inside door should be a mesh-wire so that when the outside door is opened the adult foxes cannot leap through to the general enclosure where the runway would be so great that it might be difficult to catch them, or drive them back into the pen.

As the mother fox will always run out of the den when the attendant opens the door, this arrangement offers excellent opportunities for him to look into the nest and to examine the condition of the cubs without her knowing what is being done; especially if a board

blind were built between the den and the fence so that she could not see him in the meantime.

Foxes, or any other animals, rest far more at ease if no one enters their pens; an observing attendant can see the difference in their temperament as soon as he touches the gate to enter it, no matter how tame they may be.

This arrangement, however, does not appeal to many of the more experienced ranchmen, mainly because it offers less opportunity for them to cultivate the friendship of their animals, which considerably offset the advantages offered by the system.

The information embodied in the foregoing paragraphs should be amply comprehensive to enable persons who consult this article to devise plans and ideas of their own for den construction, if they do not wish to install one of the kinds mentioned.

ESCAPED ANIMALS

In the event some foxes escape from their pens, as they are almost sure to do, from time to time, it is well to have an extra box in readiness within the general enclosure to be used as a trap den. It should be of the same outward appearance as the dens within the pens, for the reason that escaped animals would enter it more readily for seclusion, especially if the attendant follows the foxes slowly and quietly around the pen; by so doing they will keep moving in order to avoid him; he must not let them feel that they are being driven. This trap den should set back about six or eight feet from the guard fence so that foxes cannot leap from the top of it to the turn-in, and escape to the outer world; foxes are wonderful and graceful leapers.

The chute entrance to this trap box should be pro-

vided with a drop door so arranged that when the animal enters the den it will step on a board that will spring the trigger and cause the door to close, preventing the fox from running out again when the attendant approaches, which he would very likely do because the unfamiliar equipment within the box differs from the den to which he is accustomed.

A mesh-wire wing about twenty-five or thirty feet long leading out "V" shaped from two corners of the trap box (embracing the chute entrance in the same manner as the wings to a quail net) would materially assist in guiding the animal directly to the entrance, through the chute, especially if one wing intersects with the guard fence, because escaped animals of any kind would always run alongside of the fence; then it would be certain that the fox would pass in between the wings, but if it is driven too fast it is prompted by nature's impulse to leap upon and pass over the box without entering it; they do not always rush pellmell into a strange den; through animal intuition they have inherited the popular slogan "safety first." Give them their own time and they will enter the den with slow, cautious consideration, in which their innate distrust in all things of human design is further evidenced.

DEVELOPING FOXES FOR THEIR FUR ONLY

(This is the "natural plan of ranching" theoretically based)

If it is the attendant's intention to kill a number of foxes each season for their furs, his aim should be to produce the finest pelts possible. To this end, a general

enclosure or developing pen of from five to ten acres should be provided in which all foxes that are to be pelted should be released as soon as they are weaned, where they would have ample room in which to run and exercise during the entire period of adolescence. This activity in the open at this particular time is conducive to fine furs, providing the animals are properly fed to assist nature in its course of development. Since all released animals would be of corresponding ages, and would be pelted as soon as their pelts were prime, the association of sexes for the time intervening would make no material difference.

If the guard fence around the breeding pens would enclose sufficient acreage, it might as well constitute the developing pen and dispense with the necessity of building an additional one, for the construction would be the same as described under the caption of "General Fence and Pens Construction." This developing pen should have fresh water running through it, with hillsides, embankments or cliffs facing the south in which the foxes might construct their own dens as intuition directs. It will be observed that wherever possible these animals will dig their dens into the south side of such places, and always at a point above the mark of inundation if it is available to them. Yet, they would readily occupy artificially constructed dens.

Inasmuch as clay soil or white limestone is injurious to fox furs, the developing pen should be as free of both as possible, especially of limestone. Gray or sandy areas are preferable. The foxes would gather a considerable amount of nature's own food within the developing pen; such as frogs, crickets, grasshoppers, mice, berries, worms, beetles, etc., but a feeding pen must be con-

structed, in which the foxes should be fed each day, where they will learn to come at regular intervals. The entrance to the feeding pen should be through a drop gate, so the foxes may be taken at will by lowering the gate from the tower or elsewhere, with a cord; then they may be driven gently into the smothering box as described under the caption of "*Killing Fur Animals.*"

The box should be placed alongside the fence, into which the animals could be easily driven without excitement because of their natural inclination to seek seclusion.

Foxes that are not to be pelted should never be trapped, nor should they be allowed to see others so trapped, because they would become suspicious at once, refusing to enter the pen again while the attendant remains in the vicinity.

Under these semi-natural environments the wild instinct of foxes will develop rapidly, intensifying their characteristic desire for obscurity in the recesses of the wilds. They will remain semi-domestic, however, until around mid-winter or breeding time in the early spring, when they will become nearly as wild as if they had never been in captivity. Inasmuch as they are to be pelted as soon as their furs prime, this inclination to return to the wild state is of no material consequence.

Wild rabbits (preferably the common cotton-tail variety) should be released in the enclosure at frequent intervals for the foxes to chase. There is nothing better for them than fresh rabbit; they thoroughly enjoy the chase which adds liberally to the exercise that contributes so much to the production of good furs. The wilder the rabbits, the more exciting and beneficial is the chase, otherwise the domestic hutch-raised rabbits

would do as well. If pigeons are released in the pen they should have one wing clipped enough to prevent them from flying.

It is this exercise in the open, proper feeding (as described elsewhere) and nesting in the earth that develop their pelts to a superior quality. An egg each day, for about ten days before pelting will add largely to the luster or richness of their furs. Raw carrots ground with meat will also develop the luster.

By frequently traversing the grounds of the enclosure the attendant will soon locate every fox den and know where all are to be found. He should walk completely around the enclosure, on the inside, each day, to watch for any sign of foxes trying to dig out by scratching under the ground layer of mesh wire. If evidence of digging around the fence is found, a few sticks or stones jammed into the excavation will so discourage them that they will discontinue digging. Unless foxes are closely confined, they seldom, if ever, attempt to dig at these places. It is more likely that a wild fox would try to dig in, from the outside, to avail itself of the company of those within, especially around mating time.

In the accompanying illustration the guard fence enclosing a fully equipped fox ranch is shown, covering about ten acres, which constitutes the general enclosure or developing pen where foxes that are to be pelted may be maintained in a perfectly natural environment, and where their furs may be developed to the fullest degree of elegance; yet they are under control.

This plan of ranching under perfectly natural conditions is referred to at the beginning of this article as being theoretically based, because of no known precedent to have established its feasibility, yet it is based upon

a foundation of theory as solid as the Rock of Gibraltar.

Where the quality of fur is not to be specially considered, the guard fence need not take in more acreage than is necessary to enclose the breeding pens, in which case the watch tower should stand on the outside.

Old trees should not stand near enough to demolish fences in the event they are blown down. Mulberry trees and elderberry bushes are safer, more desirable and provide considerable natural food for the foxes.

FEEDING

Foxes are nervous, distrustful animals, but they do not become unduly excited by the daily visits of their keeper if he attends them tactfully; in fact, they soon learn to welcome him at each meal time, as a hungry farmer welcomes the daily ring of the dinner bell.

Rabbits and muskrats furnish the greater part of the meat food for foxes in the wilds, which they supplement with birds, bird's eggs, chickens, pigeons, wood-rats, field mice, crawfish, crickets, grasshoppers, grub worms, log worms, bugs and beetles. They eat nearly all kinds of fruit, apples, berries, and almost any garden vegetation either raw or cooked.

Most attendants feed their foxes on beef, horse meat, mutton, rabbits, chickens, pigeons, birds, liver, hearts, tripe, mashed potatoes, stale bread with milk, corn meal mush with milk, dog-biscuits, fox biscuits, ground meat cooked in mush, boiled carrots, boiled turnips, etc.; in fact, foxes may be classed as purely omnivorous animals and they may be fed in much the same manner as dogs may be with foods either raw or cooked.

If rabbits are raised and released within the fox pens

at frequent intervals where the animals may catch them and kill them in their own way, the attendant would be furnishing them with nature's own food, in a perfectly natural way with the assurance that there is nothing better for foxes than a live rabbit once or twice a week, or an occasional chicken dinner furnished in the same fashion. Live birds, pigeons, guinea-pigs, mice, water frogs, etc., should be given to the foxes at every opportunity as a diversification from artificial food preparations.

An unsound opinion prevails among fox raisers that before rabbits are fed to the foxes they should be killed, dressed and drawn, because of the frequency with which rabbits' heads are infested with parasites, and as a preventive measures against the fur balling up in the stomach of the foxes from which internal complications might arise.

Inasmuch as it is known that rabbits contribute the greater part of the fox's natural food in the wilds, it would appear, upon the face of it, that this supposition is without foundation. Yet it may readily be seen that this condition could arise in a fox pen where the animals provided with live rabbits only once or twice a year, would be prompted by greediness for a natural meal to eat "hide, hair and tallow" of the rabbit, getting an overabundance of the fur. Whereas, if they are given similar foods frequently, they would eat less of the hide and hair, but enough to derive benefit rather than injury, because a little roughage is essential to all animal life. We know that all wild carnivorous animals eat more or less hair and feathers from the skins of their victims, and a benefit to their stomachs is undoubtedly derived from it because of the lime and iron they contain. Every

little act in wild animal life plays its part, intuitively, in assisting nature in its strange provisions.

In fact, a crude anatomical analysis conducted by a number of trappers of keen perception discloses that in all instances where hair and feathers are found in the stomachs of trapped animals, intestinal worms are absent, but, where worms are present, hair and feathers are absent. On the other hand, it is possible that the large hutch raised, domestic rabbits, upon which so much fur grows would produce conditions entirely different from that of the little wild cotton-tail variety upon which all of our carnivorous animals prey. But, irrespective of these differences, the little cotton-tail or the prairie jack-rabbit would be by far the better kind for this purpose because of the much livelier chase they would give the foxes. This is one of the reasons why the attendant should raise, for his foxes, rabbits that are developed in an open field where they would become as wild as nature could make them, as is described under the caption of "Enclosures" in the rabbit division of this book.

Oatmeal with milk or bone broth thickened with wheat bran, or corn meal, are excellent for either old or young foxes; especially for the prospective mothers. It is the common custom with nearly all attendants to feed their foxes meat in the morning, and cereal foods in the evening. Theoretically, it would seem that this custom should be reversed, for it is certain that all carnivorous animals venture out in search of their prey immediately after sunset, winter and summer. All cooked foods should contain a small amount of salt, unless rock salt is provided in each pen.

Foxes are very fond of fish, but it would be as well, or perhaps better, if it were not fed to them, especially

in summer, unless it is absolutely fresh and untainted, and never at any time when milk is given; this combination frequently terminates in a ptomaine poisoning effect that is harmful to the animals; resulting in death at times. Foxes do not require meat each day; two or three times a week is sufficient. Meat that contains bone should be passed through a bone-grinder to prevent the foxes from being choked on it, which sometimes happens excepting in the case of bones that are too large for them to attempt to swallow. Ground bone also provides the lime that is so conducive to a good strong frame in young, growing animals.

Foxes should be fed regularly, twice a day. To prevent their getting tainted meat during warm weather, care should be taken to give them only as much as they will clean up at each meal. If the meat is tainted, it must be boiled thoroughly before the foxes are allowed to have it.

When feeding hard, dry bread, such as hard-tack, or animal biscuits, it is much better to spread them with butter, cod fish oil, grease, gravy, or tallow to soften the food; foxes like the fat contents of these spreads; they are especially fond of the fish oil, and it is beneficial to the young animals. There are several brands of dog biscuits on the market which might be very good for foxes. Some manufacturers make biscuits that are specially prepared for these animals; they are all very good, and it is believed that they may be used generally, because it is claimed that they contain a variety of food ingredients that would make diversification less essential. An excellent recipe for making biscuits is given under the caption of "Animal Biscuits" on a subsequent page of this book. A small amount of molasses on the

cereal food for foxes will be very beneficial in developing glossy, silky furs. The animals will soon cultivate a taste for it.

Many successful fox ranchmen feed fat pork at the mating season which is believed to keep the animals in good physical condition for that occasion, for it is then that they are more active than at other times. Some roll the meal in sand before feeding it to foxes, claiming this to be nature's own remedy for all intestinal parasites to which these animals are heir. Whether or not, this sand will act in response to the claims made for it, is not proven to the satisfaction of some authorities, for it is observed that foxes do not drag their food in the dirt except when some enterprising cub is trying to steal another's portion; at which the tricky youngsters are very adroit.

It is claimed that if a mother fox is given a fair amount of fresh blood, or fresh brains, during the first few days of the existence of her cubs, it is a positive preventive to her killing and eating them. But this possibility is so remote that the precaution seems scarcely worth the effort if the mother is judiciously fed with foods well diversified. Yet, *safety first* is a virtue within itself.

A fur ranch attendant who is capable and tactful should be quick to observe the many opportunities that present themselves from time to time to further the ties of friendship between himself and his animals, for much of his success depends upon their confidence in him. These opportunities present themselves to greater advantage, perhaps, while he is feeding them than at any other time.

The scientific preparation of fox food is one of the

essentials to success, yet it is just as important to acquire the art of feeding it properly. When foxes are overfed they will sometimes bury the remaining portion for use in a time of need, for which they make preparation, following their animal instinct, just as they would in the environment of the wilds. When the attendant observes this he should immediately remove the buried portions and lessen the daily allowance to only that which they will consume, for overfeeding is more dangerous than underfeeding. About a quarter of a pound a day is considered an average meat ration. Yet foxes that are to be pelted should be fed liberally from the beginning of the fall season, because it is upon strong, well-fed animals that the finer furs grow, and overfeeding at this particular time is not likely to occur. An abundance of fresh water and a lump of rock salt should be kept in their enclosures, where they may lick it as their systems require it. When snow is plentiful water may be omitted, because they prefer to lap the snow instead. All watering vessels, or feeding dishes, should be cleansed daily and boiled at least once a week.

MATING FOXES

It is generally believed that foxes choose their mates and pair off about the month of December, and if properly and congenially mated, they will remain so for life. Then, it is essential that the attendant be extremely careful in mating his foxes to be sure that each one is acceptable to the other. This is easily determined by closely observing their general daily attitude toward each other. If they appear quarrelsome, or if they seem indifferent to each other, they should be remated immediately. If foxes are properly mated it will be mani-

fest in their devotion to each other, yet a thoroughly devoted and affectionate fox will occasionally appear vicious and greedy at meal time, except immediately after the cubs are born, when he becomes extremely considerate of and attentive to his mate in taking food to her before he eats his own.

It is said by some that after foxes have once been mated, it is impossible to remate them to others. While this may be true in some instances, it is surely not the case in general, for it is known that many of them may be successfully remated each season, and that some foxes are of a purely polygamous nature. If the fox is kept in sight of his former mate with which he was congenially associated, some difficulty might be experienced in the attempt to remate either of them until the cause is removed.

For increased vigor in the progeny, the fox should always be about a year older than the vixen with which he is mated; then just before the breeding season they should be given worm capsules as a precaution against the possibility of their constitution being lowered at breeding time by the presence of these parasites to which they are subject; they will all have them at times, but the cubs are much more susceptible to worms than are the parent stock.

BREEDING

If the best results are to be expected in breeding foxes, and in raising their cubs, wherein lies the only hope for full production, the ranch should be closed to all visitors from about January 15 to May 15 of each year to assist in abating the nervous characteristics of these animals which presents the greatest obstacle of

hindrance with which the attendant has to contend in ranching them successfully.

It is essential that strict quiet be maintained within a reasonable ranch zone so that unusual noises or strange sights shall not occur to cause apprehension around breeding time, nor while the cubs are small, especially during the period in which they are blind. Foxes breed but once a year, so if a litter is lost it will be twelve months before another crop can be procured.

The breeding season is usually from February 15 to March 15 of each year. The young are born fifty-one days later. Accurate records must be made of all breedings so that the attendant will know exactly when to expect the stork to arrive. The few days prior to this momentous event, and the first two weeks following it, are unquestionably the crucial periods in the welfare of the young animals, and in their future development.

Sometimes it will be found that a fastidious vixen will not mate with the fox with which she is associated. This may be attributed to either of two causes—sterility or mismating. If it is a case of mismating, she will usually breed readily if she is mated with another fox, unless she is overly apprehensive or suspects that someone is near, in which case she will not breed until all fear is dispelled; this presents but one of the many advantages of the watch tower. If sterility is the cause of her refusing the attentions of her associate, she should be pelted as soon as the fur becomes properly prime, because in this event she would be only an expensive ornament to the herd.

One or more polygamous males will usually be found in every herd of foxes. These can easily be located from the watch tower by observing their unmistakable efforts

to associate themselves with females of the herd, other than their own mates. At least one of these males should be retained to meet the emergency when some discriminating female refuses to accept the attentions of her mate when nature has provided the time. In this event, her mate should be removed immediately and the dissolute libertine admitted to her pen or she to his, through a connecting chute, so that no undue excitement may be created on the part of either of them. In this way it is very likely that a seasons' litter would be gained that was certain to be lost otherwise.

Foxes breed only once a year at the present state of domestication, but it is generally believed that a few more generations of domestic propagation will enable careful attendants to secure two litters a year during their breeding usefulness, which is about ten years.

The young number from one to nine at a litter; the average is perhaps not more than three and a half to four. The mother will not come out of her den for the first two days after the cubs are born. The father fox is an attentive provider for his family and takes food to her door at each meal time, but she will not permit him to enter the nest. He remains on guard in the immediate vicinity of the den day and night to warn her by his little puppy-like barks of approaching danger, or of things unusual. The less he barks the more contented she will be; therefore, the necessity of the ranch being closed to strangers and that unusual sights and strange noises be avoided at this critical period, for if he is kept quiet, she will feel a greater sense of security for her cubs in the assurance that there is no immediate danger.

Foxes that are retained for propagation should not be

fat at breeding time; the thinner they are the better the results will be. Commencing a few days before the breeding season begins, both the fox and the vixen should have a light daily feed of fresh raw lamb, beef, horse meat, or rabbit. Lamb is the better if it is easily procurable because it is more heating to the system. They should also have a raw egg with warm oatmeal and milk each day just before the breeding time. These are good strengthening foods that are conducive to a more receptive mood, and possibly to an increased number of cubs to the litters.

When black or extra dark foxes are bred to those showing more silver than themselves, the length of the guard hairs on the progeny will be increased, which is a recognized mark of elegance, greatly increasing the value of their pelts. In the case of some foxes showing too much silver, or others showing too little of it, cross breeding would bring out the desired effect.

I am not alone in the opinion that one male fox is sufficient for several vixens, and that mating them in pairs is unnecessary. While in all probability this is true, those who have had considerable experience in breeding these animals claim to have derived better results from retaining them in pairs. If an attendant wishes to try polygamy for the sake of determining its possibilities, it is suggested that he keep the vixens completely out of sight of the fox at all times, and that only one female be admitted to him at a time during breeding season. In this way the possibility of the fox forming too strong an affection for any one particular vixen is avoided. It is my opinion that if this attachment is prevented, one fox will be sufficient for several vixens during a season. The greatest danger underlying

this attempt is in the possibility of the vixen refusing his company on such short acquaintance, which they might sometimes do, resulting in a season's litter of considerable value being lost.

Rather than risk the loss of a valuable litter it would be the part of wisdom to do all experimenting with red foxes which can be obtained cheaply, for whatever may be accomplished with the red variety may be reasonably expected of the silver foxes, because these animals are of identical physical construction with only a distinctive color-type difference. Inasmuch as black foxes are practically domestic animals, the attendant would probably meet with more resistance in raising the red variety than he would with the black, especially so if the red foxes were brought in from the wilds; therefore, he should make an effort to secure the ranch-raised red foxes for his experiments. There are quite a number of ranchers raising red foxes who would sell them at reasonable prices; then the consequent loss of a litter would be of no material difference financially.

In this and in the following articles will be seen the indispensable need for the observation tower, upon which success and failures largely depend, because it is from there, and from no other place, that all really natural movements and conditions can be observed successfully while the animals feel a sense of safety in their solitude. The foxes must not know that the attendant frequents the tower, otherwise much of his advantage would be lost in their extreme curiosity which would be immeasurably aroused to determine just what is going on within it.

CARING FOR THE PROSPECTIVE MOTHER

Beginning a week or ten days before the young are to arrive, the prospective mother should be given a little codfish oil on her food each day, to strengthen the bones in the embryos. She should be fed each morning with fresh liver, fresh tripe, milk with a raw egg, or bone broth thickened with raw cornmeal, or oatmeal. Liver, being a good laxative, should be fed liberally at this time and for a few days after the young are born to guard against a siege of constipation which frequently attacks the mother during this period. Tripe is also a good laxative, but not so effective as the liver would be.

The evening meal should consist of some cereal with milk, supplemented with a small amount of boiled carrots mashed with the food, or the carrots may be ground and fed raw, with the cereal. In the absence of cereals, stale bread or animal biscuits may be fed with codfish oil, gravy or milk, to soften it; the fish oil is especially recommended for reasons mentioned in the foregoing paragraph. About a teaspoonful of lime-water should be given in the milk, or on the food each day as an additional assurance of good strong bones in the developing young. The same evening meal should continue until the cubs are weaned, assuring a sufficient flow of milk to enable the mother to nourish them properly.

The mother should be supplied with plenty of fresh water on the day that the young are expected, because at that particular time she would be extremely feverish. Also a freshly dressed and drawn hutch rabbit or a couple of live guinea-pigs, a live chicken or live cottontail rabbit should be placed in her enclosure so she may catch it and kill it, as the naturally wild animal instinct would direct. The attendant should make all move-

ments as slowly and quietly as possible; all unusual noises should be specially prohibited at this particular time to abate nervous excitement.

If the father fox enters the chute on the day that the young are expected and comes out "backwards," it is reasonably sure that the stork has arrived. But if he turns around and comes out head first, it is equally certain that there has been no increase in the fox family.

After the cubs arrive the mother will usually come out for food on the second or third day. If she fails to appear within this time, the nest should be looked into, even at the risk of having to deliver the young to the questionable mercies of a foster mother, because this would be sufficient evidence that there are unfavorable conditions within the den.

If the vixen shows a disposition to be quarrelsome with the sire just before or after the young are born he should be driven immediately to an adjoining pen where he should remain until the cubs are weaned; but if they are congenial he may remain with her until the cubs are about four weeks old, then if he seems quarrelsome with the youngsters it would be better if he were retired to the individual enclosure because he would be likely to snap them at meal time during the family scramble for food.

He may be returned to the vixen after the young have been transferred to pens of their own where they are to remain until they are pelted, or until the time when they must be paired off with unrelated mates and shipped elsewhere for foundation stock, or retained for additional nucleus.

When it is necessary to separate the animals, the attendant should never attempt to catch either of them

with tongs, or otherwise; the fox should be allowed to enter an adjoining pen through a connecting chute that may afterwards be closed with a drop door, or slide, as shown in "General Fence and Pens Construction." If he is slow in passing through the chute of his own accord he may be driven slowly and cautiously through it, so that neither he nor she may become suspicious. She, especially, should never be excited nor alarmed in the least at this critical period because it is claimed by experienced fox raisers that any form of excitement around whelping time is almost certain to cause losses among the cubs, yet it does not always do so, for when I was a boy I captured a female red fox by digging her out of her den only a few days before the cubs were born. I kept her in a barrel until I could complete a small enclosure and build a den out of rocks and gravel mortar, in which the cubs were born and where she nursed all of them until they were large enough to run about the pen actively; but on one stormy night the little pen was wrecked by a ranch horse which was staked out too near it, permitting my family of foxes to escape to the wilds of Yellowhouse Canyon where they were irretrievably lost. But "Safety First," for all precedents fail in the fox family.

CARING FOR THE YOUNG

Young foxes are born blind and nearly hairless; their eyes do not open until they are about twenty-one days old; sometimes a little earlier if it is a warm spring season. The mother will usually wean them of her own accord when they are about ten weeks old.

As young foxes begin to eat liberally of solid food when they are about six or seven weeks old, it is better

for the attendant to wean them immediately thereafter, because they will be better breeders if they are taken away from the parent stock before they have an opportunity to instill the fear of man into them preparatory to weaning, in accordance with their wild animal instinct.

Young foxes are so valuable that the attendant is prompted to accord them considerably more attention than the irritability of the mother fox will permit. They are subject to both intestinal and external parasites, but the mother's anxiety for their safety makes it hazardous to permit of their being treated for these little pests until the cubs are about twenty-one days old, or until their eyes open, after which time the mother's anxiety for their safety seems to wane considerably.

The attendant should never attempt to treat the cubs or even to touch them until after the twenty-first day following their birth. Yet instances are known where mothers have been transferred from one den to another, without ill results, when the cubs were not more than five or six days old. A strong, healthy cub should weigh about one and one-fourth pounds at about five weeks of age; if any of them are underweight at this age or if they begin to look scrawny as they grow older, it is probably because the mother's milk is insufficient to nourish them properly, or because the stronger cubs are fighting off a weaker one from the food.

In such cases a pan of warm, fresh milk should be placed inside the den twice a day, which they will soon learn to lap. After they are about four or five weeks old they will run outside of the den, when they will begin to chew on solid food, of which they should not be permitted to have too much, especially of meat, until they are well weaned, or until their stomachs are strong

enough to digest it properly, for this is about the most dangerous period in their lives because of the effects of the complete change their stomachs undergo at the weaning time.

As soon as the cubs begin to run about the pen, the meat that is intended for the mother fox should be placed upon a table where it would be out of reach of the cubs, and fastened there, so that the mother could not drag it to them, because it is likely that they would get too much of it before they are able to digest it, from which a laxative condition would result, temporarily and perhaps permanently lowering the constitution of the cubs.

Whether or not the cubs within the den are doing well is always evidenced in the mother's composure or in the lack of it. If during the first twenty-one days of their existence she comes out of the den in a nervous, restless temperament, frequently whining, it is reasonably sure that conditions are not as they should be within it. This is so evidenced in her actions generally that an uncertainty on the part of the attendant would be purely his lack of observation.

Young foxes grow rapidly after they are weaned; acquire their winter coats of fur and prime considerably earlier in fall than do the older animals. They breed during the first spring season following their birth, or before they are one year old, but as a rule their first litters are comparatively smaller than succeeding ones.

If the mother fox suspects that the whereabouts of her young are known to the keeper, she may drag them from the den in an effort to hide them elsewhere; finding no place of apparent seclusion she will drag them around the pen, often causing serious injury or death. In the

absence of a suitable den into which she may drag them, she will be likely to dig a hole and bury them where they would smother or die from cold, unless they are immediately rescued by the attendant.

This possibility is quite successfully forestalled by judicious ranch keepers who provide two dens in each female's enclosure, so that when she becomes doubtful of the safety of her cubs in one she may drag them to the other, in which she will feel quite secure. The attendant should stay away from them at least until their eyes are open, or until he sees them come from the den of their own accord. After they begin to run about in the den the mothers' fear for their safety seems to subside to such an extent that they may then be handled without fear of ill results.

If an excited mother should lose her instinctive prudence and attempt to drag the cubs from one den and not transfer them to the other, a complete diversion of the mind may often be effected if the attendant will toss her an egg or release a chicken, rabbit or guinea-pig in the pen where it will immediately attract her attention; then the attendant should withdraw from her sight.

If her mind is not diverted by one of the ways mentioned in the foregoing paragraphs, about the only alternative is to close her in the den with her cubs for at least half a day, or until her brain storm subsides. If she can not get out of the den with her young she will probably return them to the nest unharmed; if she does not do so, the attendant should return them, after driving her out; then if she refuses to care for them, they must be taken from her.

Frequently when an attentive father fox sees the mother trying to drag her babies from the den, he will

immediately drive her back to the nest and keep her there by standing constant guard over her until her nerves subside, or until she discontinues her effort to remove them.

If for some reason the cubs must be raised without the mother, they may be fostered successfully by an ordinary house-cat until they are about three or four weeks old, when their teeth become so lacerating that she will desert them. As their eyes are open by this time, they will learn to lap milk immediately, when the attendant will have no further fear for their safety.

After the cubs are large enough to run about the pen, both the mother and father keep close watch over them until they are weaned. If at any time they suspect danger, each one will grab a cub by the loose skin back of its neck and drag them into the nest; repeating the action until all youngsters are safely within; then the father fox will stand guard in the den at the entrance to the nest-box to prevent the meddlesome youngsters from running out again until all sign of danger has passed.

Young foxes have frequently been taken from the mother, fostered by a nursing house-cat and brought to maturity. But, by all manner of reasoning it seems far more feasible that a nursing dog would be the better foster mother because of the closer relationship of the canine and the fox families, and general habits characteristic of both.

Even though I know of no precedent to have established this fact, I do not hesitate to recommend it. A small dog of the long haired variety would be preferable, because the long hairs would be warmer for the cubs, and she would be less likely to harm one if she should roll over on it.

The flow of milk from a small dog would be equal to that of a mother fox, while a cat would be unable to supply sufficient nourishment to three or four young growing cubs, and perhaps bring up a family of runts.

Young foxes have been found frozen stiff, where the mother had dragged them into the cold in her attempt to hide them during the night. After wrapping them in warm, dry, flannels, they have been revived, and having been successfully fostered by a cat, they were raised to maturity, seemingly none the worse for the few hours of frigidity they had undergone.

If all foxes are weaned from their mothers when about six weeks of age, they will soon become so tame that they will eat from the keeper's hand. It is much better that they be raised in this way, because it instills in them more confidence in the attendant, which is conducive to more successful breeding, and better mothers, from which the fear for the safety of their young will will naturally be considerably lessened. However, many successful raisers leave the weaning entirely to the vixen unless she shows signs of emaciation, in which case the cubs should be taken from her, and she should be fed liberally until she returns to normal vitality.

The first natural instinct which develops in the mind of the young of every living creature, is to play. For a time proportionate to future development, play is the only thing over which they have concern. That playful instinct being purely a provision of nature, every possible effort should be extended to develop it, especially so with cub foxes, which are exceptionally playful. To that end they should be provided with playthings just as a child should be.

Cub foxes are especially fond of playing with any

rolling or easy moving object, such as a ball. They also like a box in which they can hide, and upon which they can jump while being cheerfully chased by other members of the family. They also get a great deal of amusement from a piece of an old blanket or a cotton sack, (not burlap), they jump on it, roll on it, and a number of them will tug at it at the same time, each in effort to wrest it from the other.

If boxes furnished for the amusement of the cubs are large and light, they should be well staked down to prevent the mischievous youngsters from pushing them near the walls of the fence, from which the adults might leap to the turn-in, and escape over the top to the general enclosure where it would be difficult to capture them without giving them a long and unduly exciting chase from which their nerves would not subside for a considerable time. Foxes quickly learn to make a running double-leap from the earth to the box, and on to the turn-in with one continuous action. The height they can reach by means of this double leap is really remarkable.

If a small cub happens to escape the parental pen through the meshes, or if it should crawl prematurely from the nest to some place in the pen where neighboring foxes can see it, the attendant would have no trouble in locating it from the tower by observing the actions of the foxes in adjoining pens, all of them peering in the direction of the youngster, and pushing their paws through the meshes of the fence in an exciting effort to rescue the wandering youth.

FEEDING THE YOUNG

When young foxes begin to make their appearance in the den at about four weeks of age, a pan of milk should be placed inside of the den each morning near the nest box, with about a teaspoonful of lime water added to it for every cub in the litter.

After they are about six weeks old they will begin to make their appearance outside of the den, or in the pen, when the milk should have two raw eggs mixed in it for every four or five cubs, and the lime water should be increased to one teaspoonful for each of them.

When they are about seven weeks old they should have small joints of bone to gnaw on, such as that of muskrats, chicken legs, chicken heads, rabbits, guinea-pigs, or birds of any kind; the bones and joints should be nearly meatless. These are very beneficial to the teeth of the cubs, and the lime content of these joints is an excellent preventive of rickets in the growing youngsters.

When the cubs are about two months old a teaspoonful of ground beef, tripe, or fresh meat of some kind, for each cub, should be placed within the pan of milk each day. This meat ration should be increased, gradually, until their stomachs are strong enough to digest a full meal of it, when the lime water may be discontinued, for they will secure the necessary lime from ground bone, and from gnawing on meat joints thereafter.

Never at any time should meat that is intended for young foxes be placed where it would come in contact with the earth. It should be stripped from the bones and then placed in pans. When they begin to gnaw large bones, or joints, it is practically impossible to prevent the cubs from dragging them to the ground, but

from these they would eat less dirt than from the meat.

The attendant's strict application to the requirements in feeding, and to the calories contained in the daily rations are necessary if it is hoped to successfully develop a family of foxes to the superior strain.

The requisite number of calories for the animals at their different stages of development will be found on a subsequent page of this book, under the caption of "Caloric Food Values."

If the young foxes are properly nourished they should weigh from fourteen to fifteen ounces each, at about three weeks of age, or as soon as their eyes open; then within about ten days more, they should weigh about one and a quarter pounds. If they are underweight, the food allowance should be increased. If one in particular is short of the normal it should be fed separately and liberally, because it is likely that others have been fighting it away from its portion of the food.

DISEASES OF FOXES

Foxes are not heir to many diseases; neither do they develop them where prophylactic measures are adhered to by the attendant. The more frequent troubles with which the attendant has to contend are fractured or perhaps broken bones caused by falling from the turn-in, to which they often climb, especially after having been frightened. Unless the bones are broken they will heal of their own accord within a reasonable time. But if a leg is completely broken it should be cauterized and encased in a jacket to hold it in place until it heals, and until certain that the bone is strong enough to support the animal. If the casing is wrapped with a bandage saturated with iodine the animal will not gnaw it off.

In the case of amputation at any time, an anaesthetic must not be administered, because it will kill foxes. Fresh wounds soon cure themselves.

Practically every disease that develops in the fox yard can be traced directly to improper food causing inflammation of the stomach, from which various ailments arise. The best cure is complete sanitation, dry dens, with about twenty-four to forty-eight hours of fasting. About one part of fresh milk, to six parts of boiled water will quench their thirst during the fast; this will also help to maintain normal vitality and bodily strength of the animal.

A severe laxative condition may be checked in the same manner, preceded by a dose of castor oil, and followed by a small dose of laudanum; but generally speaking, the "fasting" will suffice unless the indisposition is caused by intestinal parasites. The fasting should be followed with a short feed of cooked milk or milk with eggs, given sparingly several times a day until the stomach returns to its normal condition.

Where foxes are confined in unclean narrow quarters they sometimes contract ear mites, or ear canker, as some call it. These mites cause the animal great pain, and sometimes reach the inner ear, causing death. If given prompt attention these parasites are easily destroyed.

Symptoms: The animal holds its head to one side, shakes its ears, scratches them with hind feet, rubs them against objects, such as the pens, walls, or corner of the den. The inside of the ear is coated with a thin lining of reddish substance and thin scales which are easily scraped off. If some of this coating is scraped off with a small sliver of wood and placed on a piece of thin, clear

glass or in a very small bottle, the mites may soon be seen crawling over the glass, or up the sides of the bottle; the small amount of scurf scraped off would contain many of them.

Treatment: Use about one ounce of powdered derris to two and a half gallons of water which is well sudded with castile soap. Wash out the ears thoroughly with this solution, and repeat the operation within six or eight days. The two treatments should be sufficient, provided the entire pen and all objects with which the animal could possibly come in contact, are thoroughly disinfected to kill the numerous mites that it would rub or scratch off. The same mixture may be used for disinfecting the entire surroundings.

Mange might appear among foxes if the place is not kept thoroughly sanitary, otherwise, very little fear of it need be entertained. In the event it should develop, complete isolation of all animals so affected should be the first treatment, then their former pens, and dens, as well as those of all others should be cleansed thoroughly and disinfected. A microscopic examination by a veterinarian should follow, to determine whether the mange is of the Sarcopic, or Follicular kind, so that he may decide upon the proper treatment to be applied.

Sarcopic mange confines itself nearer to the skin's surface, but it spreads so rapidly that it would soon denude the animals of their fur if it were allowed to continue without attention, causing their skins to become thick and spongy; yet, being on the surface, it is quickly responsive to treatment.

Follicular mange, which is more stubborn to treat, usually imbeds itself deeply within the pores of the skin around the head and directly over the back, mostly in

spots. At the first appearance of this disease the services of a reputable veterinarian should be engaged, because if mange of either kind once gets a start on the ranch it is an almost endless job to eradicate it completely. (See "Mange on Animals").

Vermin and fleas sometimes attack foxes, with the result that their vitality is lowered materially. (See "Vermin on Animals".) Dust their dens with sulphur, powdered tobacco, or insect powder at frequent intervals.

A young fox will sometimes have a swollen jaw, caused by the deciduous teeth failing to shed. When this is noticed, the offending teeth should be extracted at once with small forceps. It is usually the canine or eye-teeth that cause this trouble; being more deeply imbedded in their sockets they do not shed easily.

Rickets: All young animals, especially young coons and foxes, are subject to rickets, (weak joints) causing them to reel as if intoxicated. This is caused by lack of sufficient lime in their general food to build up good strong frames of their own.

Treatment: See "Lime water," ground joints of green bone should be given in their food, which is an excellent preventive of rickets, by building strong bones in the young animals.

After the animals mature, this ailment is probably incurable, but it is never fatal. Foxes with rickets, should not be retained for breeding; they should be pelted as soon as their furs prime.

Worms in young foxes unquestionably cause more anxiety on the part of the attendant than any other infirmity to which they are subject and are more dangerous than anything else with which he has to contend. It is believed that worms are contracted from either of two

sources, probably from both, from contact with the earth or from the milk they drink.

As a preventive of worms, the opinion is advanced by some authorities that all fox pens should have wooden floors, not allowing the animals to come in contact with the earth at any time. While it is reasonably certain that the quality of fur produced would not be so good as that of foxes that run on the ground, the visible difference might be as nothing when compared with the hygiene and general health of the animals. Some fox raisers are now advocating the use of concrete floors which would act as a preventive of worms, and greatly lessen the daily labor along the lines of cleanliness, but it seems to be the opinion of the more observing zoologists that the lime contents of the concrete is sufficient to burn the animals furs, sometimes to the skin.

One large fox raiser near New York City who has tried raising them on wooden floors for several seasons, with no appreciable difference in the quality of fur produced, is now contemplating adopting the wooden floor system throughout his entire ranch.

A bicephalous worm, known to fox raisers as Hookworm sometimes appears among foxes in some localities. These worms are so dangerous to young foxes that when the symptoms are noticed, no time should be lost in eradicating them. The symptoms are weakened loins, dull, lifeless furs, loss of vitality, staring, glassy eyes and general debility.

Remedy: Carbon Tetrachloride, dose: adults, "00" capsules. For young "0" capsules. For sale at almost any drug store.

Care must be taken in giving these capsules to be sure that they are pushed down well below the base of the

tongue, otherwise the animals would not swallow them, or they would probably burst them, in which case they would very likely die from strangulation, because this medicine is exceptionally strong. Some attendants who never take chances, always insert the capsules with a balling gun, which may be procured from dealers in veterinary supplies. Hook-worms are extremely difficult to eradicate.

Roundworms, which are extremely harmful to young foxes, are also of frequent occurrence, but after they are once eradicated they seldom recur in the same animal. These are of cylindrical formation with the smaller end more elongated. When they infest the intestines of young foxes they will prove fatal if they are not eradicated within a reasonable time.

The symptoms indicating the presence of these parasites are, dullness, frothing at the mouth, barking, dragging themselves with their front feet, and sometimes convulsions.

Tapeworms also infest foxes; while these are not so fatal as some of the other kinds, they destroy the gloss and deaden the furs so that the animals present unsightly specimens. The existence of any of these intestinal worms would so greatly lower the vitality of young foxes that neither the animals nor their furs could develop unless the attendant treats them immediately after determining the presence of the parasites.

Remedy for either: A good worm medicine, as carried in drug stores for the treatment of puppies, or worm capsules specially prepared for foxes. These should be given when they are about twenty-one days old, then again in about two weeks, and as often thereafter as intestinal parasites appear.

Another good remedy is about $\frac{1}{2}$ grain of Santonin each day until five or six doses are given. As all worm medicines are poisonous, they should be followed with a purge such as castor oil, within four hours after they are given. Some successful attendants do this regularly about every thirty days with all young foxes, as a preventive measure regardless of indications of worms.

Another good remedy is to give them an occasional feed of mashed flaxseed with milk alternated with six or eight drops of turpentine in milk. Castor oil with a few drops of turpentine is also very good for eradicating worms. Any remedy that is given by hand, in capsules, must be pushed down below the base of the tongue, otherwise, they will not swallow it.

Foxes should have nothing to eat for about twelve hours before internal remedies are administered, but they may be fed the regular ration an hour after the purge is given. Medicines have a better effect on empty stomachs.

Some persons might wonder why, if these animals are so frequently infested with destructive worms, that they ever survive in their natural environment. They would surely succumb, in the wilds, were it not for a provision of nature by which, they intuitively eat laxative vegetation to rid themselves of these intestinal parasites. Since this vegetation can not be found within the fox yard, the young foxes must be attended by man, else they perish.

In many cases where foxes have died from causes unknown to the keeper, anatomical examinations have disclosed that the loss was occasioned purely through the attendant's lack of care, and inattention to essentials. Unclean feeding dishes, tainted meat, and impure water,

are productive of many diseases among fur-bearing animals. Dishes should be scalded frequently, and kept clean at all times, with clear, fresh, drinking water provided in abundance each day. With these precautions, plus sanitary conditions, few diseases will ever appear among foxes, or any animals.

If a fox raiser feels that his practical knowledge of the essentials to successful ranching is inadequate to meet the emergencies, he should be governed by the advice of a dependable veterinarian who is accustomed to treating small animals. So valuable are fox cubs that the keeper can not afford to take chances. *"An ounce of prevention is worth a pound of cure" in this business.*

KILLING

Foxes that are to be pelted should be removed quietly and completely out of sight of the others. They may be humanely killed by administering chloroform, or carbon bisulphide, in an air tight box that is built for the purpose, and into which they are driven. (See "Killing Fur Animals.")

SKINNING AND CURING

Foxes should always be skinned with the claws of the animal left attached to the pelt, which should be removed "cased," for in that condition they are desired by almost all fur buyers. An orderly procedure for taking fox pelts with the claws attached, is to begin where the skin of one hind foot intersects with the claws and slit the skin through the center of the inside of the foot, down the inside, outer edge, of the hind leg and around the under side of the tail, at its base; then up the other

hind leg, through the center of the foot to where the claws begin; then skin out both hind feet to the place where the claws intersect and sever them from the feet, from the inside, leaving them attached to the pelt. Next split the skin of the tail completely to the end in order to be certain that all of the tail-bone is removed; otherwise, this would decompose and cause some of the tip and tail-hairs to fall out, greatly depreciating the sale price of the pelt.

The skin should now be removed from the animal by stripping it down over the carcass, glove fashion, using the knife only in cutting ligaments to free the skin from adhering flesh. The skin may then be stripped down the front legs to the feet, which should be carefully skinned out to the first joint of the claws, where they should be severed from the foot, remaining attached to the pelt.

Considerable care must be used in skinning around the base of the ears not to cut the fur, but to cut out the thick part of the cartilage, at its base, leaving the ears attached to the pelt. In addition, one must be careful not to cut the fur while skinning around the eyes and down over the muzzle and around the lips, as far as there is fur.

The pelt should now be adjusted to a stretcher, with the fur inside, and stretched not more than enough to prevent it from wrinkling and shrinking while it is drying. The pelt may be retained in proper adjustment with a few small tacks driven through the extreme edge of the skin, at the upper end of it. Immediately after it is adjusted, it should have all fat and adhering flesh scraped off with some dull-edged instrument such as an old rasp, a dull hatchet, or a large spoon; this process is usually called "fleshing."

As silver-fox furs are very valuable, much care must be taken not to damage the pelts in any way while skinning, as by cutting them; allowing them to become blood stained; failing to scrape off all adhering flesh thoroughly before hanging to dry; overstretching, or by failing to open the tail and foot slits completely so they will dry quickly. These slits may be held open by means of small wooden slivers extending across horizontally, from edge to edge of the skin so the interior will dry quickly. If this is neglected decomposition would likely occur at these parts greatly damaging the pelts.

The extreme end of the slit from which the tip end of the tail bone is extracted, being difficult to expose to the air sufficiently to cause it to dry quickly, a small amount of salt should be pushed down into the pocket to cure the remaining flesh and prevent decomposition. The salt should not be applied to the pelts otherwise.

It was once the common custom of trappers to use alum in curing pelts, under the supposition that it would "set" the fur. This is a mistaken idea, however. Neither salt, alum, nor solutions of any kind should be used in curing pelts.

After the pelts have been thoroughly fleshed they should be hung in a cold, dry, shady place to dry; never near a fire, nor in the sun. When they are nearly dry they should be removed from the stretcher, turned fur side out, and readjusted to it, where they should remain until they are thoroughly dry. Then they may be removed, and wrapped separately so that the flesh side of one can not soil the fur of another by coming in contact with it.

The pelts are now ready for shipment.

SELLING THE PELTS

Local fur buyers are to be found in nearly every town in this country, as well as traveling fur buyers who visit all towns and communities in fur producing districts in search of choice pelts. Silver fox raisers seldom, if ever, sell their pelts locally, or to traveling buyers who, as a rule, do not recognize their value. They usually have them sold at auction through reputable commission houses in one of the large fur centers, or direct to manufacturing establishments who specialize in handling fine furs, and whose buyers are quick to recognize the quality and pay the price for actual value, regardless of the source of origin.

Skins well matched, and sold in pairs, always bring a much higher price than would the same skins if they were sold separately. To this end, it would seem advisable for the ranchman to acquire the art of properly matching his pelts, and ship them so, which would enable his dealer to present them nicely matched up, and receive a better price for the lot than he could hope to receive otherwise. The large reputable commission dealers, and fur buyers who have a reputation to maintain are all inclined to treat the trappers and ranchmen fairly, and to secure the highest possible prices for them.

SELLING THE LIVE ANIMALS

The sale price of live animals for breeders, of course, is always much greater than the pelt price would be. These sales are usually made through inserting advertisements in publications devoted to out-door interests, or through selling agencies that may be located through this same channel.

The successful fox raiser will, as a rule, find sufficient outlet within his own immediate vicinity, for more animals than he can raise, because as "he succeeds" others will be only too anxious to climb a few rounds of the ladder toward the success that he is enjoying, and would be prompted to purchase some foundation stock from him.

SHIPPING THE LIVE ANIMAL

It is true that live foxes may be shipped successfully on a six or eight days' journey without food or drink, but it is advisable to have them fed and watered each day, which the express men would gladly do if the shipper makes provision for it. The watering may be done in a small square pan securely nailed in a corner of the shipping crate. The crate in which foxes are shipped should be covered completely over, or lined thoroughly with a one inch mesh wire to preclude the possibility of escape by gnawing their way to liberty.

When the foxes reach their destination the recipient should take them to their pens immediately, then he should quietly make an opening in the crate large enough for the animals to pass through, and then quietly withdraw from their sight. Within a few minutes the animals will come out and inspect every part of the pen without undue excitement.

After they have made the rounds of the pen a few times they will enter the den slowly and cautiously. After they have inspected every part of it, they will come out again and re-inspect the pen, and will feel quite at home within a day or so, whereas, should the attendant remain within the pen, or even within their sight when they first emerge from the shipping crate, they would

probably rush against the wire fence in their excitement, resulting in possible injury.

At the first feeding time the attendant may remove the crate in which the animals were shipped. He should make all movements slowly, quietly, and cautiously for a few days until his foxes begin to show unmistakable signs of friendship, when they will begin to expect him, and to welcome him in recognition of the source from which their food comes. He will experience no difficulty in determining by their composure when he is welcomed.

See "Fifty Fur Raising Facts"

THE MINK IN THE WILDS

Minks are so well known to the populace of the North American Continent that a detailed description of the animal itself will not be attempted in this article. For the information of those less informed, it may be said



that some types of male minks grow to a length of thirty-two to thirty-six inches from tip to tip. Their bushy tail is usually about one-third the length of the body.

They are wandering animals that spend their time mostly in solitude. They seldom nest for any length of time in the same den, and are rarely seen collectively after the members of a family reach maturity.

Male minks are usually about one-third larger than the females, weighing three and one-half to four and one-half pounds, seldom more. Their furs are usually

of a lighter shade and coarser than that of the female. All minks have a white spot directly under the chin.

Occasionally some minks show a few silver hairs around the shoulders or directly over the hips. This leads me to believe that a strain of silver-minks could be developed through a careful system of selective breeding, much on the order of the costly silver-fox, eliminating the possibility of successful substitution with inferior furs by means of the dyeing and tipping process to which some manufacturers so liberally resort.

If this were accomplished, much might be expected of it; the raiser would have such demands for his animals, for foundation stock, that he would be able to demand exorbitant prices for them, as did the pioneers who perfected the "fixed" strain of silver-foxes that have sold for as much as \$3,500.00 for a single pair. *The possibilities for this achievement are surely worth an earnest effort to it.*

In spite of a decisive difference in physical structure, as well as in pelage quality, the Shantung weasel of China, the Istatsi weasel of Japan, and the Kolinsky a weasel of Siberia are called minks; as Jap-mink, Chinese-mink, and Siberian-mink. While these various animals might be members of the mink family, none of their furs are comparable with the real American mink fur, which is as handsome as it is durable, and in a class entirely by itself.

It is claimed by some people of reputed authority that Jap, and Chinese minks are usually dyed furs, and that the Kolinsky is always dyed. I cannot vouch for the sincerity of this statement, nor have I any knowledge of the animals that produce these furs, other than they

are fur-bearing animals of the weasel family. Irrespective of their physical construction and pelage differences due probably to climatic environments in their respective habitats, the Shantung and Istatsi weasels, the kolinsky, and the American mink are all super members of the weasel family; being such, it is reasonably certain that the essentials to mink production would meet all requirements for successfully raising any one of them, except for a few possible characteristic differences with which an observing attendant will readily acquaint himself.

Good prime American mink furs are valued purely upon their own merits. They are never dyed to imitate finer furs, nor to disguise them in attempt to efface the real source of origin; there is no reason for doing so, if the pelts are prime to begin with.

There is but *one* real genuine mink. Its tribe is to be found only in North America where its general distribution practically covers the continent, but it is proved by various zoological incarcerations that this animal will thrive in practically all parts of the world and be none the worse in one part of it than in another. There is but one specie of the American mink; it is of several color and type varieties, all produced by individual habitat and geographic location. The largest known type of minks range from Minnesota to Idaho and northward through the Rocky Mountain region from about the central half of Colorado to the Canadian Northwest, but this super type is, perhaps, more abundant in Idaho than in any other locality. They are the largest of the tribe, producing very dark, fine, silky furs, that always command a high price.

From a general commercial standpoint it seems as if these would be the better kind with which to provide the

ranch because of their unusual size presenting a much more appealing appearance for foundation stock, or for exhibition purposes. Their physique is more tempting to prospective purchasers.

Minks that are commonly found throughout the Northeastern range of their distribution, that is, from northern New York through the New England States, eastern Canada and to Labrador are much smaller animals, seldom exceeding thirty inches in total length, but they bear furs of a darker shade that are rich, soft, and silky. This does not imply that desirable mink furs cannot be produced elsewhere, nor that production should not be attempted in more southern climates, because some of the most beautiful mink pelts have been procured from as far south as Tennessee and Arkansas, and especially in northern and northwestern Texas. Minks are to be found in greater numbers, perhaps, in southern Louisiana than in any other section of the United States. Minks from this semi-tropical climate, of course, produce pelts that are thinly covered with short undesirable furs that do not command an attractive price.

Minks are found mostly around streams where they usually have a regular route along the water's edge, over which they travel whenever they are out in search of food. Each mink owns, and so protects his food-route that if another one encroaches upon his rights to it, war ensues between them, usually to the death of one or the other of the combatants, when the route reverts to the victor, to which the spoils belong.

Minks are carnivorous animals of a nomadic nature, living mostly on muskrats, rabbits, water-frogs, (not land frogs), mice, eggs of any kind, mussels, shell fishes,

turtles, birds, wild ducks, and snakes. While they sometimes pay a visit to the henhouse for a chicken dinner, they are seldom seen far away from some stream, where they like to play around in shallow water in search of



On his regular route.

the kinds of food that frequent such places, sometimes catching sluggish fishes.

They are healthy, hardy animals with constitutions enabling them to withstand extreme cold so remarkably well that it is almost impossible to freeze them. They never hibernate, but will

come out to hunt food in the coldest of weather. The mink is a very destructive animal, especially to others of a weaker kind. It will visit a henhouse, kill a chicken and eat only the brains, then it will kill every chicken it can reach by snapping it in the head, leaving it where he killed it, making no attempt to eat any part of it. Then on the way to its den it will kill every rabbit that comes within its reach. The mink is a murderous animal which kills for the fun of killing, as long as it can find something to kill.

A close watch over minks has failed to develop anything to support the general belief that they kill chickens merely to suck the blood, neither do they cut the throat of their victims, as many persons believe. They kill their prey by snapping them in the crown of the head. (It is characteristic of weasels to suck the blood.)

Immediately upon snapping hold of their victims,

minks will wrap their long serpentine bodies around them, seemingly, to prevent possible escape.

Adult minks brought in from the wilds are almost untamable, but if they are handled carefully there should be no trouble in getting them to breed normally at the first mating season.

The young ones tame so very readily that they may be handled much as young kittens, provided they are taken from the mother when not more than about seven weeks old; after that time she seems to train the fear of man into them so thoroughly that they will never submit to handling thereafter. It is better that they are not handled more than is absolutely necessary for too much of it will have a detrimental effect on them, destroying the lustre of the fur to a great extent.

Minks nest in the wilds in creek banks, hollow logs, stumps, under bridges, under large slabs of rock, in abandoned burrows of other animals or in drift-wood along creek banks where it is out of the water; sometimes in a large clump of grass, in small crevices, or by scratching in under a cliff or precipice near a stream. They seldom, if ever, burrow into solid earth except where there is a crevice to suggest the beginning.

They are not burrowing animals, and do not dig into the depths of the earth as many believe. Yet, it is claimed by some authorities that they will burrow out of their pens, but I have never yet found any evidence of their burrowing other than to scratch out the loose dirt from under some object in an effort to make a den there, or in search of mice and worms.

They are not aquatic animals, and are not provided by nature for swimming, yet, as their feet and legs are strong, their long bodies lithe and serpentine, they swim

and dive remarkably well, remaining under water for a time almost equal to that of the muskrat. They are fond of playing around in shallow places where young minks delight in bathing.

Some authorities erroneously describe minks as being



Mother mink taking her children to the daily bath, and teaching them to hunt their own food.

“amphibious animals.” Minks are so far from that classification that they are not even of an aquatic nature, nor are they more provided by nature for a life in the water than are cats, dogs, or coons—it is merely along the banks of streams, or lakes, where the greater part of their natural food is procurable that they are prompted to inhabit these places in greater profusion

which undoubtedly lends impetus to the impression that they are amphibious.

Mother minks, while raising their families, never venture from their dens farther than is absolutely necessary to procure food. They keep protective vigil over their young with such remarkable determination that they will invariable sacrifice their own lives in defending them against either man or beast.

Young minks are extremely playful and mischievous; tormenting the mother by continually jumping all over her, and dragging her about until their pranks become so intolerable that she will soon wean them, then she will desert them entirely leaving them to seek dens of their own. Sometimes the young of an entire family will den together throughout the colder period of winter, their body heat supplying warmth to one another until just before the breeding season when they will disperse, and seek dens diversely, where they might avail themselves of unrelated mates in early spring. The males usually seek individual dens as soon as they are weaned. Adult minks of either sex are never seen collectively.

However, minks frequently inbreed, which accounts for the numerous immature, or undersized pelts that are constantly being brought in from the wilds, out of which the trappers reap a harvest of about 500,000 skins annually in the United States alone; which is nothing when compared with the present demand. They are probably graded closer by fur buyers than any other pelts of this country, except those of the costly silver fox.

CATCHING THE BREEDING STOCK

The best time to catch minks is in the spring, between the first and the fifteenth of June, when the mother is taking the young out to teach them to hunt their own food, as shown in illustration on a foregoing page. As they are then running in numbers, they are much more easily trailed to their dens where they may be dug out, capturing the entire family in a sack, which should be adjusted over the entrance to the burrow.

The digging should be done from above the entrance so the animals will not escape in running out. This may be done, even where the bank is steep, because the nest is never more than 12 to 18 inches beneath the surface, nor more than two or three feet from the mouth of the tunnel leading to it.

In all cases where they scratch into a crevice in an embankment the nest will be located to one side and just above the place of entrance at the termination of an elbow shaped tunnel leading to it, which excludes the light from the den in protection of the young minks' eyes. The tunnel leads slightly upward to prevent water running in during hard rains.

If digging is started at the entrance, following the tunnel leading to the nest, the animals will run out about the time the nest is reached, or at the first glimpse of daylight. They are so alert, moving so quickly, it would then be difficult, indeed, to catch all, or any of them.

If they are found in hollow logs or trees, cover the entrance with the sack, then by thrusting a pole over the top of it, and into the hollow, so rustle them about that they will run out, and into the sack.

Where their nests are located in a pile of drift wood, they are much harder to catch unless a wire net is stretched around them, because of so many avenues of escape. They are so extremely quick in their movements that the young with their mother will spring from the nest simultaneously; if they reach the water, they will dive under, concertedly, where they would be hopelessly lost to their pursuers.

When they come to the surface for air they will emerge only the nose, at places along the water's edge where it would be practically impossible to see them until all sign of danger is past. If the den is under a slab of rock or a log, cover the entrance with the sack and dig from the opposite side of it.

THE MINK IN CAPTIVITY

RANCHING

That minks may be successfully, and profitably raised in captivity, has been proved by numerous experiments. There are a few large mink ranches now in the United States that have met with unexpected success where the proper care and attention has been given to the animals, which are extremely easy to raise, and far less trouble than many others of the fur-bearing kind, when the essentials are understood.

The furs of minks will develop normally in captivity if the animals are properly fed. Where a little common judgment is employed they can be developed to the superior in both physique and fur.

Nothing but the larger darker colored minks should ever be retained for breeding stock. Care should be

taken never to allow what is known as the "cotton mink" to enter the herd, because these animals produce furs of lesser value. The cotton mink is recognized by the white, or light colored under-fur, which may be easily seen by turning back the guard hairs, or top fur. It is not one of a species of minks, but merely a colortype variety produced from an unknown cause, ranging mostly through southern sections.

If the area of the ranch takes in a part of a small running stream, especially if the bed of it is rocky, the ranchman has an excellent condition. A lot of underbrush, such as hop beds, elder bushes and mulberry trees would add much to their contentment; the berries also furnishing considerable food for the animals in the spring.

If plenty of dens are provided in the main enclosure, they are not likely to make much effort to construct their own in places where the animals would be hard to get when wanted. If they are frequently routed from these places they will seek seclusion in the box dens provided by the attendant.

All young minks that are released in the main enclosure would be of the same spring's litters, which would develop and prime by December 15, when they should be pelted, because they would become antagonistic to one another before mating time in early spring. They do not remain prime for more than sixty days in the year.

Adult males and females more than seven months of age should never be allowed to run together, except in breeding units at breeding time, and then only for a short period. Each male breeder should be kept in an individual enclosure at all times except at mating season when he may have the company of about five or six

females, as explained under the caption of "Breeding."

If the ranchman attempts to trap his stock of minks from the wilds, he should never use steel traps, because the animals that are so trapped, usually die from blood poisoning. He should use box traps, with a drop door at one end, set with figure four triggers, or any other style of box trap that he might devise, that will not injure them.

Minks brought in from the wilds, especially adults, are so persistent in their efforts to escape that they will often break out their teeth by constantly tugging at the wire, from which they will starve, unless they are taught to eat before they are placed in the pen.

About the only way to prevent this tugging is to line the inside walls of their pens with twenty-four inch sheet iron, or boards, that extend a few inches under-ground so the animals cannot see daylight beneath them, in which case they would try to scratch under, soon reaching the wire where they could tug at it.

While they will jump to the top edge of this iron and climb the wire, they cannot brace themselves sufficiently to be able to pull very hard against it, at least, they cannot pull hard enough to break out their teeth as they could do when they stand on the ground where they could "set back" with their weight and strength. Soon after they learn to eat mush with milk, they will lessen their efforts to escape, when the wall lining may be removed.

Some adult minks brought in from the wilds will refuse to eat, regardless of the condition of their teeth and as a result, they starve. Those born in captivity may be depended upon to be always on hand, waiting to welcome the attendant as the preliminary to each meal.

Ranch raised minks seldom, if ever, make any strenuous effort to escape; if they do effect their release they will usually return as soon as they are hungry and climb back into their original enclosures, which is easily done from the outside, if the pens are not covered over.



Friends.

Ranch raised minks will soon learn to take food from the hand of their keeper.

Adult minks, in the wilds, are almost entirely of nocturnal habits except during the early spring season when they may be seen frequently traveling about in broad day-light, and at almost any hour during the day.

This is especially characteristic of the male, when the handsome philanderer will wander through the tufts

of heather in every glen and dale pursuant to the thrilling adventures of love's charming lure.

The female will, at this season of the year, stand upon her hind feet and send forth a long drawn-out shrill upon the cold piercing air for the company of a mate; this call is usually during the frosty hours of the stilly night, when all else is quiet.

When a mother mink is brought in from the wilds, with her family, it is the better way to place her, im-

mediately, in a pen by herself, putting all the young ones together in another pen to protect them from being injured by the mother should she lose her instinctive prudence from the overexcitement of the past few hours; in which case she would snap them in the head if they were under her care.

Another reason for separating the mother from her family is to prevent her from instilling in them the fear of man, thus making them less desirable for breeding stock.

They would be old enough by this time to lap milk from a pan, and to eat raw meat, which should be given to them sparingly until it is sure that their stomachs are strong enough to digest it properly, otherwise, the result would be indigestion, from which complications might arise.

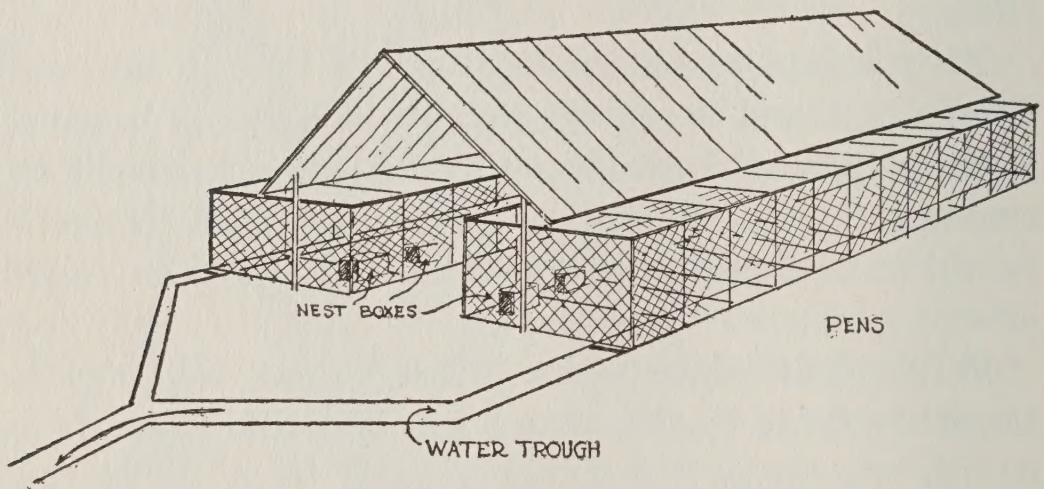
Wild adult minks often refuse to eat, but may be taught to do so by throwing a live crawfish, water-frog, or fish into the pan of drinking water for a day or two. When they learn to eat these freely, add a little fresh lean meat to one of the foregoing, and if they eat the meat, there will be no further trouble from that source. If a piece of meat is placed in a pan of milk they will learn to lap the milk from getting a taste of it while fishing out the meat. In teaching them to eat, the attendant should keep his hands from touching any of the food offered them, because of the possibility of their being able to scent the human odor, as some trappers say they can do.

It is unquestionably the better way to purchase all breeders from some established, dependable raiser who has a reputation to maintain. He could and would give much helpful advice.

THE BACK YARD MINKERY

A Home Production of Furs

With very little effort, it is possible to produce enough minks in a city back yard to bring an income much greater than the average man's salary. This plan of mink raising is not necessarily confined to the city,



or to the small town; it may be pursued in the country, as well. Since the home production of furs must be conducted in accordance with sanitary regulations, and because of advantages offered by city accommodations to meet these requirements, this article is specially designed as an avocation for persons otherwise employed.

The exact space needed for a back yard minkery is purely dependent upon the number of breeders to be maintained. For a more profitable back yard production one male breeder may be retained for every five or six females; seven animals would be required to make up the first unit, and as each animal must be retained indefinitely in an individual enclosure except at breeding

time, seven pens would be needed, unless the attendant wishes to start in a smaller way, then a trio, consisting of one male, and two females would be a more economical beginning, and the breeders would be in better proportion.

The pens for the back yard minkery should be at least three feet wide by nine feet long; this permits of sufficient runway in which to develop each litter of young to the normal in both stature and fur; it would be better if the pens were larger. The information given in the pages that follow is the guide to the mink raiser whose aim it is to produce the superior strain.

The materials used in constructing pens for this plan would be as described in subsequent pages of this article, excepting where it is intended to maintain several breeding units. Then, to meet sanitary requirements the pens should be built on two parallel platforms, each nine feet wide, with a three foot aisle between them, as a passageway for the attendant in his feeding routine. Each platform should slant from the aisle toward the outer edge for drainage.

There should be a "V" shaped trough running the entire length of each platform along the extreme outer edge, intersecting at a point leading to a sewer, or a dry well. By attaching a hose to a hydrant, and operating from the aisle, all refuse may be washed into the troughs and carried away to the sewer immediately. Then the water gates or outlets at the lower corner of the pens may be closed, and the troughs refilled with fresh water for drinking and bathing.

If the minks' feet become sore from running over the wooden floor, as they frequently do, a little sand, or dirt sprinkled over the floors will prevent the trouble.

I do not know of a concrete floor being used in mink pens, but there are several advantages that might recommend the use of it; it does not decay, is cooler in summer, is easily washed, and does not insulate the animals from the earth's electrical connection; further, I believe that concrete floors will not cause sore feet, as do wooden floors, but there is a possibility that the lime contents of the concrete would have the detrimental effect of burning their furs.

These pens should be washed each morning just after feeding, so they will have time to dry while the young minks are taking their morning nap; their usual after breakfast indulgence. As most of the refuse accumulates at night, and around breakfast time, this early morning clean-up keeps the animals and their pens in a perfectly sanitary condition from which no offensive odor could come—except imaginary ones originating in the nostrils of disgruntled mortals who are ever afraid someone other than themselves will meet success and from whom snorts will occasionally come forth. Neighborly??? complaints will not likely be registered excepting from the wantonly arbitrary who have no space in which to raise minks of their own, and not until after their neighbor has met with some degree of success will those who doubted the feasibility of his undertaking develop a severe case of "sour grapes" begin to howl "*nuisance*."

With the exception of the platform addition, all fence construction, materials used, sheds, etc., would be exactly as described under the general plans for mink raising in the paragraphs which follow. The shed mentioned in plan number two is essential to the back yard minkery because the dens are on a platform, off the

ground, and would become insufferably hot in summer if they were unprotected from the rays of the midday sun.

The nest boxes in the back yard minkery should have wooden bottoms and should stand on legs three or four inches off the platform to permit washing beneath them as well as affording better drainage and sanitation.

Assuming that the pens are to be nine feet long and the aisle three feet wide, then the platforms and aisle combined would require a space twenty-one feet wide, and long enough to accommodate the number of pens that are to be built. The shed over the pens should extend several feet beyond the ends of the aisle, for protection to the nests in the end pens.

If the back yard minkery is established in a small village where water-works or sewer connections are not available, pumping would be necessary to wash the refuse through the troughs to a dry well. If in the country, beyond the domain of dictatorial neighbors, all pens may be built on the ground and in much larger dimensions, dispensing with the platform. In this case, the watering and feeding must be done in wooden or earthenware vessels, all of which must be kept clean. The watering vessels should be large enough and deep enough for the young to bathe in, or about twelve inches deep at the deepest point. The inside walls of the bath tub should slant so the youngsters can climb out, otherwise they would be likely to drown in the attempt. A slanting board would suffice.

In this back yard plan of mink raising, the principles governing the essentials to success would be the same as those described in subsequent pages of the mink division.

The possible yearly production, based on the number of breeders maintained, may be determined by consulting the "Table of Animal Increase." The profits to be expected may be determined by reference to "The Selling Price of Raw Furs" and "The Selling Price of Breeding Stock."

As the yearly production in a back yard cannot be very great, it is likely that all animals raised there would be sold for breeders in the immediate vicinity, to be delivered as soon as they are weaned. In this case, the cost of production would merely be that of the mother's food. If they remain unsold, they may be retained and sold for spring delivery "*bred*," in which case they bring a tremendous price, usually about double that of the regular sale price for breeders.

If after the back yard minkery is established and the demand for breeders in the immediate vicinity proves insufficient to consume all that can be produced, they may be sold by inserting small advertisements in publications devoted to outdoor enterprises, or in sportsmen's magazines. Advertisements in publications of this kind are quite inexpensive. One insertion should "clean up" the entire production. *The demand is great.*

ENCLOSURES

Mink pens may be built with long boards set on ends a few inches beneath the surface, but mesh wire would be decisively preferable because of the many advantages it offers; as, better drainage, cooler, better circulation of air and more sanitary because it permits the sun to reach all parts of the pen. Sheet iron partitions are recommended by some, but these become insufferably hot in

summer, and do not permit of proper drainage, nor of air circulation.

The fencing should be of one inch mesh, sixteen gauge, galvanized wire, set about twelve to eighteen inches underground unless hard earth is encountered at a less distance. An underground turn-in about eighteen inches wide, extending inward from the bottom edge of the fence would be an additional aid in preventing the animals from digging out, but as minks are not really burrowing animals there is very little to fear from that source.

They climb with considerable agility, and can jump four to five feet straight up, making it necessary to build the fence at least six or seven feet high. It should be provided with a turn-in at the top about fifteen inches wide and made of solid board or galvanized sheet iron, so that when the minks climb the fence they will encounter this barrier, over which they cannot climb, and be forced back. The turn-in should slant downward for better drainage, and to prevent its being broken down by heavy snows.

If there are trees near enough to the fence so that minks could climb them, run along a limb and jump out, a turn-in, or collar, should be adjusted around the trees to prevent the animals from reaching the limbs, or else the limbs should be sawed off on the side nearest the fence. A mink will remain in a tree only a few minutes because of their terrestrial nature. They seldom, if ever, climb trees in the wilds.

Fence posts at each corner of the pens must be firmly set to form a solid, substantial fence, placed there to stay.

Some mink raisers cover their pens completely over

and underline them with one and a half inch mesh, galvanized wire. In this case the top and bottom turn-in would be unnecessary. Minks in a covered pen will run along the underside of the mesh wire covering in an inverted position with as much ease as a fly walks on a ceiling.

To facilitate handling minks at breeding time when the males must be admitted to the females, it is necessary to have small sliding doors or short tiling chutes leading through every partition wall so the animals may pass from pen to pen, as described under the caption of "Breeding." When the breeding season is over each animal may be segregated in its individual pen by closing the passages.

With the barn system, mentioned in plan number one, the doors through which the attendant may enter the pens should be made as described in plan number two, excepting that they must be adjusted to the outer ends of the pens. If the pens are covered over, it is likely that they would be not more than three or four feet deep. In this case the attendant could enter them through a trap door at the top.

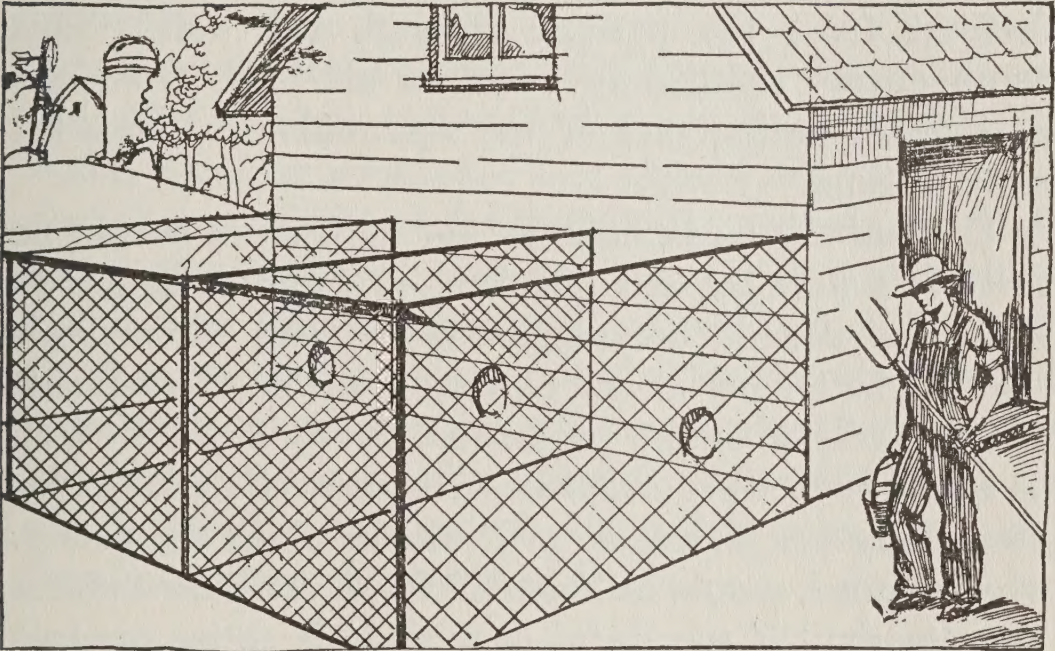
PLAN NUMBER ONE

THE BARN SYSTEM

To raise minks on a small scale, whether in town or in the country, there is no better plan than to utilize an old barn, garage, or any large building and not dispense with the use of it for other purposes. Whether the building has a concrete, natural earth or wood floor is of no material consequence, except that as the natural earth is productive of finer furs, it is preferable.

All nest boxes should be placed inside the building, the passages through the wall leading to them should be about three and a half inches in diameter with all edges well rounded and sandpapered to prevent damage to their furs as the animals pass through them.

The nest boxes may be constructed as described under the caption of "*Animal Dens Construction*" or as described in "Plan Number Two;" the entrance to the den should be thoroughly and closely fitted to the passage



Profitable mink production by utilizing an old barn, or garage.

through the wall, so the animals can not escape into the building; the runway being entirely on the outside as shown in the accompanying illustration.

If space within the building is not needed for other purposes, it would be a good plan to have an inside runway of about three feet square and deep enough to accommodate the nest box. The sidewalls and top of this inside runway may be of boards, but the ends should

be of mesh-wire to permit plenty of fresh air and ventilation. The boards covering the top of each runway should be constructed in the manner of a lid, and adjusted with hinges so they may be lifted to permit nest-box examinations, feeding, watering, etc., which could then be done within these miniature pens on the inside of the building.

In the event of an inside runway, the nest-box should be so placed within it that the entrance would face the wall, and be at the end of the box that is farthest from the passage through the wall. This arrangement completely excludes all light from the nest, contributing one of the essentials to successful mink raising.

The runway on the outside for each mink should be three feet wide by nine feet long, or as much longer as space will permit, because the more room the animals have the better will be the results; however, this amount of space will suffice for the largest family of minks, but, in addition to these small pens, a general enclosure or developing pen should be provided in which the young, when weaned, should be liberated for development unless the attendant is successful in selling his entire production for foundation stock, to be shipped as soon as they are weaned, when, in that event, the developing pen would not be necessary; inasmuch as no great number of animals could be produced with the barn system, it is quite likely that all of them would be sold for breeding stock.

Should there be a few left over that were not sold for breeders they may remain in the small pens with their mothers until pelting time in the winter and no additional pens would be needed, provided they are

pelted as soon as they are prime, otherwise sanguinary battles would ensue.

Some successful mink raisers do not advise the general enclosure plan in which young minks may be developed under natural conditions, as explained in plan number two. Of course, this plan is not entirely necessary from a fur standpoint, because it is known that minks will develop normal furs in narrow quarters, even where they are forced to nest in boxes, on wooden floors, provided they are properly fed, in judiciously diversified rations.

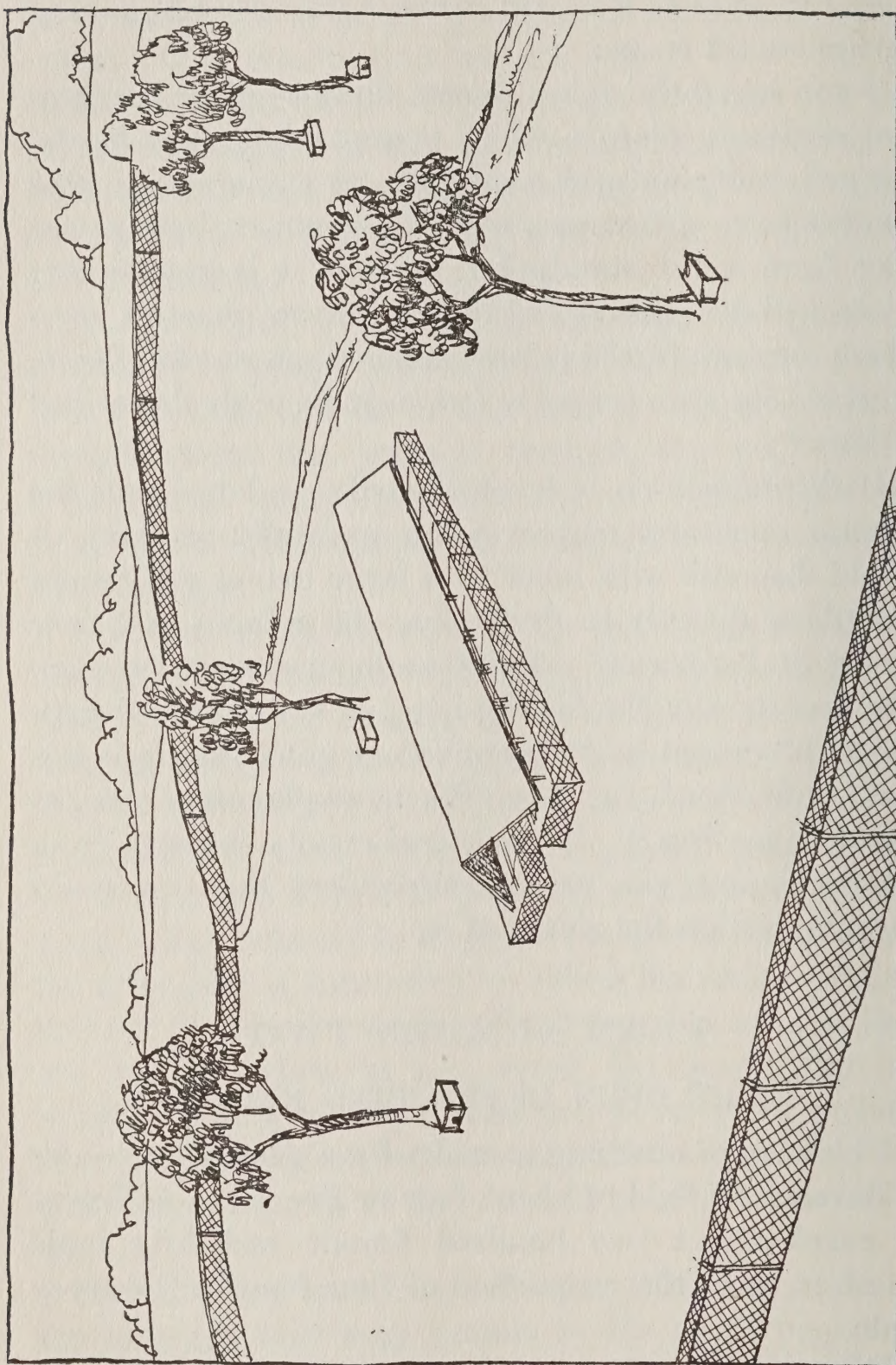
If the industry is to be conducted on a large scale the general enclosure system being naturally sanitary, it would dispense with labor to a large extent and would contribute directly to developing the animals and their furs to the "superior" rather than to an average product. The reason why the developing pen system is not generally advocated by the established mink raisers is not quite understood, for they offer no explanatory reasons for not adopting it. The general results obtained from the developing pen are so self-evident that one could hardly question the worth of it.

PLAN NUMBER TWO

THE OPEN DEVELOPING FIELD

This plan of ranching provides for a general enclosure or developing field of about four or five acres, sufficient to ranch about two hundred female and fifty male breeders, or in the proportion of four females for every male.

When the breeding pens are constructed within an enclosure of this acreage the remaining open space would



Mink ranch for developing furs under semi-natural conditions. The Developing Field System.

be adequate to develop all young of each spring's litters to animals of superior physique and vitality, upon which the finer furs may be produced through judicious feeding.

That the ranch-raised mink is a stronger and more powerful animal than his kindred from the wilds is evidenced in a number of instances where one of each, of corresponding size, were placed within the same pen. They fought fiercely, as all strange male minks do, the ranch-raised mink, in each instance, becoming master of the conflict. He was more powerful, more vigorous and better fed, consequently, his vitality and stamina were at a higher standard, proving beyond question that the proper care of minks will develop them to superior physical specimens, and bring out the fur to elegance.

From the great number of premature pelts that are brought in to the market, out of the wilds, it is evident that the greater number of animals that produce them do not procure sufficient nourishment to assist nature in developing either their frames or their furs to the greatest degree of perfection, especially during extreme winters when all smaller animals upon which they prey, enter long periods of hibernation.

The general environment of the ranch should be as described under the caption of "*Ranching.*" The requisite number of pens, about two hundred and fifty, should be built in two rows with a space or aisle about three feet wide between them. All pens should be covered with a shed, as shown in the foregoing illustration. The ends of the shed should extend a few feet over the end pens, and wide enough between the eaves to cover the pens nearly half way over, or at least wide enough to provide the nest-boxes with some protection from the

elements. The height of the shed is immaterial if it permits of easy passage for the attendant, up and down the aisle. The shed should run north and south whenever possible to permit of some sun reaching all parts of the pens, assuring the healthiest possible conditions. The eaves of the shed should come low enough to keep most of the snow and rain from the nest-boxes, but not so low as to keep out the morning and afternoon sun, otherwise the constantly shaded portions of the pens would soon become foul.

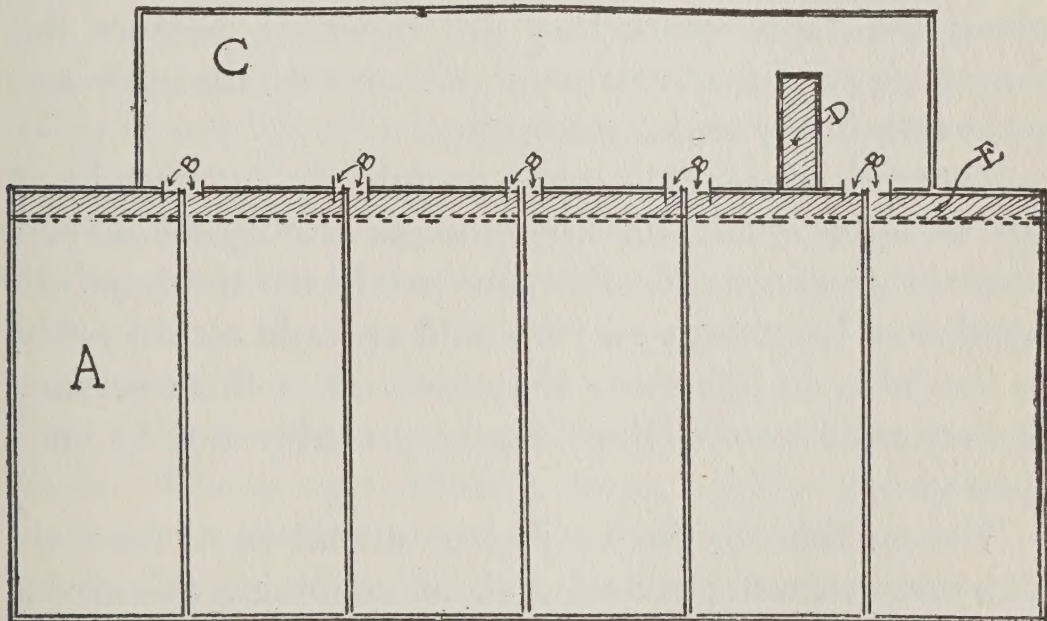
All breeding pens should have an overhang or turn-in at the top, both inside and outside, because all minks that are in these pens must be kept within them, and those that are at liberty in the general enclosure or developing pen must be kept out of the breeding pens.

Some mink experimenters contend, theoretically, that as nature intends these animals for a life in the open and provides them with constitutions fitted to withstand the extreme cold, protection from the elements, such as a shed over the pens, is unnecessary. Experience will unfold to the attendant the many uses and advantages of the shed system. For instance, it enables him to get around to the pens in all kinds of weather; keeps out rain from the nest-boxes; keeps out snow so the nest will stand in a dry place at all times; keeps out bright sunlight which is so injurious to the eyes of young minks, and provides shade for the nest-box during hot summer days, thereby keeping the animals in a more comfortable and healthful condition, all of which contribute greatly to the ultimate result and success of the undertaking.

As one male should be retained for every four females, two females' pens should be on each side of each male's pen to facilitate handling them at breeding time.

For economy and convenience, the pens may be arranged in units of five, with the male's pen running along the outer end of four females' pens, with the passageway so arranged that he may be associated with two females at a time when it is so desired.

Assuming that each female's pen is three feet wide, the male's pen must be about seven feet long if it is to include entry to the four pens. If it is desired to provide more runway for the male, his pen may extend the entire width of the four females' pens, which is twelve feet. This would make the male's pen twelve feet long by three feet wide, unless the rancher wishes to make it



Breeding unit, consisting of one male's pen running lengthwise at the ends of six females' pens. *A*—females' pens. *B*—Passageway for animals. *C*—Male's pen. *D*—Water trough extension. *E*—Continuous trough supplying water to all pens.

wider. A short backwater trough for drinking and for bathing water may extend for about two feet into his pen from the main trough.

With this desirable arrangement the male could be

associated with one or two females at a time, at the breeding season, and it is really better that he is not admitted to a greater number. With this unit construction of breeding pens, the male's pen should be lined at the inner side with boards so that the females cannot see him during the time that their young are small. Some successful ranchmen do not take this precaution, but that does not lessen the desirability of relieving the mother's anxiety for the safety of her family. That constant fear is there, and under it she cannot be normal.

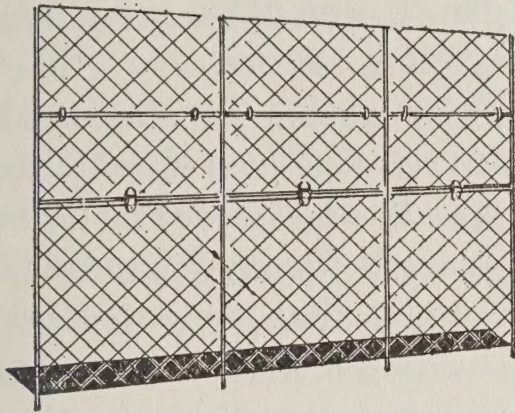
These walls to the male's pen may be made movable. When the young are weaned the walls may be removed until another crop of young are expected, or preferably about ten days before they are expected, because the females would begin to grow nervous as the time approaches, if the male is in sight.

To build pens for the males completely out of sight of the females would greatly increase the initial investment in ranch construction and not lessen the requisite number of breeding pens; it would also add considerably to the labor in operating the ranch. For these reasons the separate pen sections would probably not be considered.

The partition walls to all pens should be of one-half inch mesh wire to prevent minks in adjoining pens from lacerating each other's feet while trying to fight, which they would do by pulling the feet of one another through meshes that are large enough to admit them.

Doors must be made at the inside end of each pen to facilitate feeding, and through which the attendant may pass when it is necessary for him to enter the pens. These doors should extend from post to post in order that they may be thoroughly braced; they need not be

deeper than is necessary for the attendant to pass through them. They should be so made that the lower part of the entrance is up about twenty-eight inches



Drop doors.

from the ground. This makes it quite easy for the attendant to step through, yet, the entrance is far enough from the ground to prevent minks from running out while he is feeding them.

For convenience, the nest-boxes should be placed near enough to

the doors that when the attendant wishes to look into them he may do so without entering the pens entirely.

Watering may be done in earthen vessels placed near the feeding pens. These vessels should be large enough for the young to bathe in them, and deep enough to permit of their diving in it. If convenient to do so, the pens should be provided with a continuous concrete or half tiling trough running through the outside ends of them. This trough should be at least twelve inches deep so that the animals can dive completely under, as they always like to do. The trough should have a gradually sloping inside wall so little minks can climb out easily, otherwise they might drown in the attempt or die from chill.

The water could be piped from some nearby spring or creek, or it could be pumped in. In addition to conserving labor, this arrangement would benefit the animals by providing a desirable bathing place for the young ones, into which they would continually plunge.

It is better that bathing places be as far from the nest-boxes as possible to permit the water to drain from the minks' furs before they reach the nest, otherwise they would keep it damp and mouldy. If an old cotton sack or blanket is thrown in the pen, the meddlesome young minks will dry themselves by rolling over on it.

Every breeding pen should be equipped with a small sliding door about four by four inches, or a short piece of tiling about four to six inches in diameter should be inserted through its partition wall, forming a passage for minks from one pen to another. This, or a similarly effective arrangement is necessary to enable the attendant to associate the males and females when the time is propitious. When the breeding season is over, the passageway must be closed so the animals cannot pass through to adjoining pens.

If the attendant is possessed of sufficient inventive ingenuity to conceive a more economical or practical way to arrange his ranch it is suggested that he do so. One system of ranching is probably as good as another if it properly retains the animals in dens that are warm, dry, free of drafts, and as dark as possible in the nests.

This plan of ranching, with the space and number of breeders mentioned should produce considerably more than one thousand minks a year; in fact, there should be enough in excess of that number to pay all cost of production. In this event the sales price of one thousand minks would represent a year's net profit to the ranchman.

Fine mink specimens bring big prices when sold for breeding stock. The demand for breeders is now so great that it can never be met.

PLAN NUMBER THREE

THE FAMILY DEVELOPING PEN SYSTEM

An excellent plan for raising minks is to build large enclosures in which two mothers may raise their families to maturity, thus dispensing with the general developing pen entirely. While the initial expense of this system, for general construction, would probably exceed that of the other plans already suggested, additional cost and effort are counterbalanced by the many conveniences and advantages it offers.

Under this plan of operation the pens should be large enough to retain two mother animals in each one of them until their families are brought to maturity, or until they are weaned. But all male breeders must be retained within their respective pens, singly, except while the breeding routine is in progress, as explained under the caption of "Breeding." Each pen should be at least 25x50 feet, requiring exactly one roll of wire for the walls, and one roll for the underground turn-in. All other requirements would be as described under the caption of "General Fence and Pens Construction." The separate nest-boxes for each mother animal should be as far apart as possible to assist in allaying any antagonism that might arise between the "proud mothers" over the conduct of their miscreant children.

The watering system for these pens may be in keeping with the attendant's individual convenience and facilities, but, to greatly lessen the daily labor, and to reap the full benefit of the many advantages the system offers, a chain of concrete water basins should be constructed, one in each pen, and connected by a continuous

concrete trough running at a slight incline from a well, pump or hydrant, so that all pens may be watered from one point, and in one operation, as shown under the caption of "Family Developing Pens."

These water basins and the trough may be constructed by digging a trench a few inches wide and a few inches deep, through each pen. Then, at some level place in each pen make the trench about 18 to 24 inches wide and 24 inches deep at the deepest point, for a distance of six or eight feet, to constitute the water basin. Line the ditches and the basins with heavy gravel, or with one-inch mesh heavy galvanized wire to support the concrete and prevent it from cracking. Then line the walls and bottom of the ditches and basins heavily with concrete, and use molds made of board to press it into the desired "V" shape; leave the molds in position until the concrete solidifies, forming concrete water basins and troughs to carry the water to them from the well or from wherever the source of supply might be. The basins must have sloping side walls so that when the young animals plunge in for a swim they can crawl out again without meeting resistance in an unclimbable bank, and drowning in the attempt to get out. These basins would afford enjoyable swimming pools for the young minks throughout the day and night.

In pens of this size the young animals would get a much larger range of exercise than would be possible in the smaller breeding pens system. If the nests are placed at points as far apart as possible, the mother animals are not so apt to exercise their pugnacious activity disastrously, because the defeated one would have room enough to run and effect an escape from its assailant. Regardless of their proximity, it is not likely that

either would enter the nest of the other to seek a conquest, for such is not customary with wild animals of a corresponding kind.

The females (breeders) retained in each pen may be all of one family, but the male with which they are associated during the breeding routine must be of unrelated stock, to prevent inbreeding. All young males that are not pelted during midwinter must be retired to individual pens, otherwise they would kill each other.

When female minks are more than one year old they can not be kept together in these pens because they will soon learn to indulge in community gossip from which frequently arises a free-for-all fight, resulting in loss of life to some of the comely combatives of the colony.

This manner of ranching retains the animals under more perfect control, and dispenses with considerable labor and loss of time at mating season, offering at least two advantages over the general enclosure system. Also, this plan of retention simplifies the breeding routine by which a 100 per cent production is more certain. The orderly mating procedure being not other than to shift each male to a different pen every two or three days throughout the entire breeding season, to appease the fanciful whim of some fastidious female that might exact a beau-brummel more polished in his demeanor than was her former admirer.

After the breeding season is over, one female may remain in each of the developing pens until after her young are weaned, when she must be retired to an individual pen which may be of much smaller size, but the entire family of youngsters, or even two or three families of corresponding ages, regardless of sexes, may associate in each pen until pelting time, but they must be

either pelted or separated by January 1, or trouble will surely ensue.

Although this plan of ranching offers advantages worthy of the fullest measure of consideration, it is far more expensive in construction than the General Enclosure system would be.

NEST BOXES

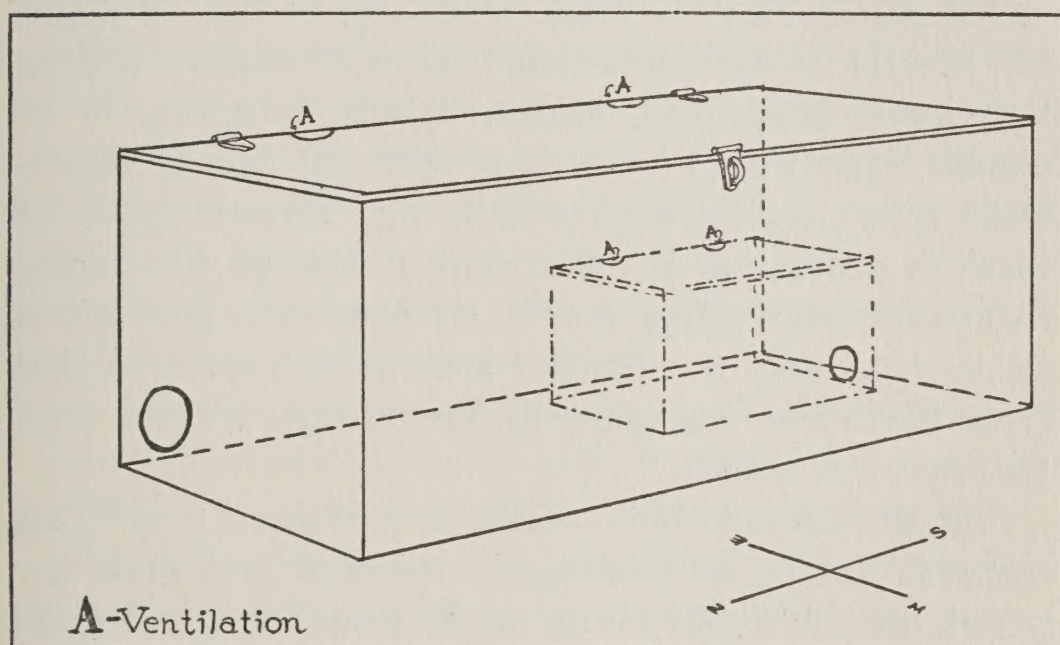
Most assuredly it would appear to inexperienced persons that minks should be permitted to make their own dens as their wild animal intuition directs them, especially the weaned youngsters that are released within the general enclosure to be developed under conditions as near to real nature as would be consistent with advantageous control.

Theoretically this would be the proper course for the attendant to pursue, but as these animals in the wilds construct new dens into which they move as soon as the older ones become foul, available den space for minks in captivity would soon become exhausted, especially if the minks were raised in large numbers, because for some unknown reason they will not again occupy nests of their own make that have once been deserted.

Where artificially constructed dens are cleansed, disinfected and furnished with fresh bedding at frequent intervals to preclude unclean conditions, minks would occupy them indefinitely and would always be at the keeper's command, which the natural burrows would not permit.

Each breeding pen must be provided with a nest box that should be constructed in the manner of a box-within-a-box as described under the caption of "Animal Dens Construction" it should be placed inside of the pen

near enough to the door that the attendant can reach it without entering. Both the inside and outside boxes should have hinges and latches on the lids. The outside box should be about eighteen inches wide, twenty-six inches long and twelve inches deep. The inside, or nest box, should be about ten inches wide, twelve inches long and ten inches deep. Too much room within the nest box would be as harmful as too little of it, because waste space in the den would encourage unclean conditions,



Nest-box, within-a-box.

and would not be so warm. Cleanliness within the nest box is of paramount importance.

For economy, one side and one end of the outside box may form one side and one end of the nest box. The entrance to the outside box should be about three and a half inches in diameter, and about two inches up from the side that the nest box adjoins. The entrance to the nest box should be of the same dimensions correspond-

ingly made in the opposite side, and corner, to the entrance in the outside box.

This arrangement forms a runway inside of the outside box, around the nest box to its entrance, excluding all light from the nest. Plenty of fresh clean hay, old rags, etc., should be thrown in front of the pens so the minks may make their own nests, which they prefer to do.

These boxes should have a one and one-half inch mesh wire bottom with a strip of wood about two inches wide nailed across over the wire, from end to end, at about the middle of the box so that the wire bottom will be thoroughly supported, because it will be necessary to transfer the den at some time with the family intact. Both boxes should have a little dirt thrown inside of them in order that the wire may not make the minks' feet sore from running over it; the busy little youngsters are so extremely mischievous after their eyes open that their florescent rose-gardens are always strewn with the thorns of youth.

The entrances to these boxes, as well as all projecting corners, should be thoroughly rounded and sand papered, otherwise the young minks would do great damage to their furs while playing, by constantly running against these corners and breaking off the guard hairs that give the luster to the fur. If no shelter is provided, the dens should be made with slanting roofs, for better drainage.

For reasons given elsewhere, two dens should be provided in each pen, the second one need not be placed within until about the time for the young to arrive, then when they are to be weaned they may be transferred together in the den to the general enclosure where they

are to remain until the pelting time in winter, when these dens may be returned to the breeding pens (after being thoroughly disinfected) just prior to the arrival of the next spring's litters. The other den, which remains in the breeding pen, would be occupied by the mother. This does not require extra nest boxes, it only means that those which are to be occupied in the developing pen are temporarily used within the breeding pens until the young minks are weaned.

FEEDING

All feeding and watering (unless the trough system is used) should be done in wooden or earthenware vessels, never in tinware, because the rust that accrues from it would kill minks if they should swallow it. The vessels should be arranged so they will not tip over from the weight of the animals; this applies especially to the young when they play around it.

Unless the watering is done in a continuous trough, as described elsewhere, it should be in a vessel large enough so that the young may bathe without splashing all the water out. Minks need not be given water when snow is available; they prefer to lap up the snow.

Stale corn bread with milk, oatmeal with milk, or cornmeal mush with milk are always good for minks. These should be supplemented, three or four times a week or oftener with three or four ounces of fresh lean meat of some kind, either beef scraps, rabbits, chickens, pigeons, sparrows, mice, rats, fishes, muskrats or guinea-pigs. They prefer the chicken heads to any other part of the fowl.

If minks are raised in large numbers, it would be advisable to raise rabbits for them. The ranchman would

receive enough revenue from the sale of rabbit furs and the flesh to more than meet the cost of raising them, and in addition he would have his meat supply for the minks without cost.

Minks are fond of rabbit heads, from which they eat the brains. Gnawing on the skull is good for their teeth, and extremely beneficial in building good strong bones in the growing youngsters. Cooked food for minks should always be as fresh as possible and not contain much salt.

If rabbit or muskrat meat is kept in cold storage from skinning time until winter it should never be given to the minks while frozen; it is better to boil it, or cook it with mush, or make biscuits of it, as described under the caption of "Animal Biscuits." These are good for a general diet because they are composed of a variety of food properties rendering diversification less essential.

It is the habit of all minks to drag meat into their dens or to bury it if they are given more than they can eat at the time; the buried portions decompose, causing the nest and surroundings to become foul.

Do not overfeed; three or four ounces of meat at each feeding is usually enough. A continued exclusive raw meat diet would cause minks to have fits; yet too much cereal food is not sufficiently substantial to properly support the bodily strength for any length of time. All cooked food, especially porridges, should be given to them warm in winter. While stale wheat bread or corn bread is preferable to fresh bread, it should be soaked in milk or gravy for a few minutes to soften it.

Several large rocks, or small boxes with holes in them should be in every mink enclosure; they always like to hide behind something while they are eating to prevent

sharing their portions with others. This accommodation brings contentment at meal time and prevents fighting, which is sometimes accompanied with serious results.

Minks will often refuse to eat while the attendant is near, but they will soon learn to take food from his hand, hide it and return begging for more, pretending that they have had nothing, no matter how much is given to them. Through this little bit of strategy they are likely to impose upon the good nature of a kind-hearted attendant whose inclinations are to be subservient to the caprice of his animals. The portions they should have may be governed by the amount they will clean up at each meal; usually about four ounces of milk in the morning and four ounces raw fresh meat at night is sufficient.

Minks must have some green vegetation, which they will eat only when their systems require it, determined purely by animal intuition inherited by the strangeness of nature which has made provision for everything. This needed green food would be prevalent within the general enclosure if it is sown with alfalfa and white or sweet clover; however, much of the necessary vegetable substance for minks in the frequent oatmeal and cornmeal mush allowance makes other vegetation less essential.

Alfalfa or clover hay should be in the breeding pens at all times, otherwise the minks within these pens at times would chew their nest hay, which is more or less unclean, causing sore mouth or intestinal troubles.

If the keeper has a pond he should fence it in and stock it with muskrats and fishes, on which to feed his minks. The muskrat furs would pay him a profit and

furnish the meat supply for the minks, which could be supplemented with fish from the pond. Unless the attendant desires to raise game fishes for table food, carp would probably be the better breed because of their quick growth. If sufficient vegetation is raised and thrown into the pond, the muskrats would not molest the fishes. Both are self-supporting; that is, they would need no attention whatever other than to throw the vegetation into the pond where they can get it.

If the attendant is so situated that he can procure live minnows, or small fishes to throw into the minks' water basins, he should do so, for they are specially fond of capturing their own food. It is really amusing to observe the remarkable skill with which young weaned minks capture the fishes.

If the ranchman raises muskrats from which to procure his meat supply, he must so construct his fence that minks from his herd or from elsewhere can not enter the muskrat enclosure, for two or three of these murderous animals would destroy the muskrats as fast as nature could produce them. They would enter many muskrat houses during a single night and kill every young one they could find, regardless of whether or not they were hungry.

Muskrats should be taken only in early spring, when the fur is prime. The meat may be placed in cold storage, where it will keep throughout the summer. Minks will not eat fat meat. Very little or no salt should be in their food. Do not give them pork.

Male mink breeders should be fed all that they will eat each evening. Just before they bring their young, females should be fed about a quarter of a pound of meat twice a day, or more if they will consume it. This allow-

ance should be continued until the young are weaned or until they begin eating solid food. Supplemented with the daily feed of meat, all mothers with young should have fresh milk each morning with a thick warm mash, such as oatmeal, or cornmeal mush, to assure a sufficient milk flow to properly nourish their families.

Young growing minks, after they are weaned, will eat more than the adults, yet it is not wise to feed them more than they will clean up at each meal, for it is obvious from results obtained by experiments that over-feeding has nothing to recommend it. About five pounds of oatmeal (dry weight) or mush with two gallons of fresh sweet milk would be sufficient for about one hundred minks a day.

Two or three times a week is often enough to feed warm oatmeal with milk to the weaned youngsters. The oatmeal should always be cooked until it is comparatively dry, otherwise if it is too watery it frequently ferments or sours in the stomach, unfavorably affecting the digestive organs of the animals.

If minks that are to be taken for their fur are fed an egg two or three times a week and given meat with carrots ground with it, they will develop wonderfully glossy, silky furs that are far superior to any from the wilds. It is in the main enclosure that the furs are developed to superiority; however, they will prime normally under almost any conditions, even when the animals are forced to nest in wooden boxes that have wooden floors; but it should be the purpose and pride of the attendant to produce the superior rather than the average animals and furs.

When meat is given to young minks it should be cut in small bits so each one will be sure to get its share,

otherwise there will be a general family fight for food. When meat is given in large pieces each mink tries to wrest it from the other, so that the stronger ones will get too much and the weaker ones perhaps none.

All minks that are to be pelted should be thoroughly fattened in the early fall so their constitutions will be at a standard capable of producing good furs, then nature will do its part. They must have an abundance of well diversified fresh food from the time they are released within the developing pen until pelting time in mid-winter, otherwise much fighting will occur among them, from which cannibalism frequently develops.

Fresh water each day is essential except when they can get snow. The pans or dishes in which they are given water should be kept thoroughly clean, as a preventive measure.

Particular attention must be paid to the manner of feeding, the kind of food given and its caloric value; special attention should be given to the food of the mother mink during the period of lactation, to enable her to properly supply each of her young with a sufficient amount of caloric properties to effectively promote their growth to the superior strain after they begin eating solid food. She will not eat a bite until she has fed each one of her youngsters.

The number of calories contained in different foods and the amount the mother should have for a daily ration for each young she is nursing will be found on a subsequent page of this book under the caption of "Caloric Food Values."

When a mother mink is left in a weakened or run-down condition from the strenuous task of nursing her youngsters, a raw egg each day, given with her regular

ration, will quickly restore her to normal vitality, especially if the egg is given with oatmeal and rich milk.

BREEDING

Only the larger, darker specimens of minks should be retained for breeding purposes; the male mink especially should conform to these requirements because his progeny is most generally the counterpart of his type.

Minks are polygamous animals which breed but once a year, as a rule, but in the event a mother loses her first litter early in the season, she might bring another.

While the breeding season is from the last week in February to the fifteenth of March, it is largely governed by existing weather conditions and geographic location of the ranch. If the spring season is early and warm, the minks mate earlier, while if it is late and cold they would mate later. In one instance during a late cold season, none of a herd bred until about April fifteenth.

The height of the breeding season is around March tenth to twentieth, when all of the herd will become receptive within about ten days of one another if the season is conducive to it. The receptive period with the female is probably not more than four to six days, but she will come into the receptive mood two or three times during the season, at intervals of about a week. The young are born from six to seven weeks later, in litters ranging from three to eleven in number. With the exception of a little downy white fur, they are born blind and hairless, remaining so for three or four weeks or longer if the weather is cold; they develop much faster when the weather is warm. They are of such imperfect formation at birth that were it not for the extremely

long necks and noticeably large heads, they would much resemble young rats. After young minks fur out and their eyes open they develop so rapidly that the males are nearly as large as the mother at three months of age.

Female minks reach sexual maturity when about eight months of age, but do not attain their full growth until they are about two years old. Male minks also mature sexually at about the same age, but they do not become full grown until they are nearly three years old.

Commencing three or four days before the breeding procedure begins all breeders should be fed liberally with fresh raw meat scraps and a raw egg each day; these are conducive to greater inclination on the part of both sexes to breed.

Unless the "Family Developing Pen System" is adopted, all female breeders should be kept in separate pens at all times, and adult males must never be allowed to associate with one another. During the breeding routine each male may have the company of five or six females, but better results and increased stamina in the progeny would probably be obtained if he had the company of not more than four. This is best done by opening the sliding doors or passages between the pens and admitting the male to one or two of his quota for a day, and then drive him back to his own pen for a day, then admit him to the others for a day, and so on throughout the entire breeding season.

This transferring, alternately, from one female's pen to another should continue until about the fifteenth of April, or until the attendant is reasonably sure that all have been bred, for in the breeding lies the only possibility of full production.

The receptive period with minks is only of four or five days' duration, but it will develop two or three times during the breeding season, at intervals of about a week, and they will frequently accept the attentions of the male at each occasion, making it impossible to determine the exact term of gestation, but it is generally supposed that the young are born about forty-three days after the effective mating takes place.

Larger and stronger litters will result if the male is one year older than the females with which he is associated; when this is attempted the attendant must be extremely watchful over them so that if she fights him too fiercely, causing him to skulk away and renew the attack at short intervals, they must be separated immediately, otherwise, being the larger and stronger animal, he would likely kill her; this rarely happens when the animals are of corresponding ages.

Minks breed so readily in captivity that the attendant need not be doubtful of securing results if he will seclude himself while the sexes are together, or pass along from pen to pen, because some of them will refuse to mate while he is too near them; then if he is careful in associating the sexes at the opportune time which is easily determined by swollen parts visible on both males and females, his production is reasonably certain, yet there will be an occasional "miss" as there would be in anything else, for there is nothing that is one hundred per cent certain. If the attendant could get ninety per cent production from animals, domestic or otherwise, he would do well.

When the male is first admitted to the female she will always resist his attentions to some extent by fighting him, but if he persists in following her with a slightly

muffled chuckling sound, they may remain together, for it is reasonably sure that they will mate within a few minutes. When the fighting is such that he must be removed from a pen, he may be transferred to another where he would probably meet with a more cordial reception.

After the breeding season is over the males should be kept in pens as far away from the females as possible, because the mothers know, by intuition, that the males would kill their young if they could get to them. This keeps the females under a nervous strain until after the young are weaned, and that nervousness would probably affect their ability to properly nourish their families. If the males and females are kept in adjoining pens, as they would likely be, it would probably be the better plan to line the side walls of the males' pens with boards so that the females can not see them until the young are weaned, when the boards may be removed to permit of better air circulation during the warmer months.

The ranch should be closed to strangers from the beginning of the breeding season until the young are about six weeks of age, because mother minks are very distrustful of strangers while their young are small, but they are not made nervous generally by unusual sights and noises unless they are in too close proximity to them.

All breeders and young minks retained as breeders should be marked as described under the caption of "Marking Fur Animals," so the attendant can handle them in a way to prevent inbreeding. This may also be accomplished by systematically numbering the pens to indicate related or unrelated stock. For instance, all females in pens bearing even numbers would not be re-

lated to males in pens bearing corresponding numbers, while all males and females in pens bearing odd numbers would be related to one another. The attendant should work out his own system of numbering, as he sees it, to prevent confusion at breeding time, and keep a set of cards on which records and results of all breedings are kept. Also, these cards should carry a record of the numbering system on the pens.

Regardless of the numbering system, all young minks should be marked as described under the caption of "Marking Fur Animals," before they are liberated in the general enclosure, because many superior breeding specimens that the attendant would not care to dispense with, will develop among the animals just prior to the pelting time. Then if he should desire to retain any of them for breeding purposes it would be an easy matter to determine from what parentage they sprang, and inbreeding would be avoided. Yet, when the science of inbreeding is thoroughly understood, a great deal can be accomplished through it, especially in perfecting and permanently fixing desired color types.

Watch your minks, study them, use judgment as in anything else, then success in mink raising is assured. Nature will do it—the elements do not hinder it.

CARING FOR THE YOUNG

About six or eight days before the young are expected, each female should have one teaspoonful of lime-water in her milk each morning. After the young are born the portion of lime-water should be increased, gradually, until the young are getting about one teaspoonful each by the time their eyes open. This allowance should be continued until they are to be weaned, when it may

be discontinued because they will then secure all the lime needed, from chewing the joints of chicken bones, heads, feet, rabbit joints, etc. Gnawing these bones is also very beneficial to their teeth.

At the time of farrowing, considerable whining or squealing will be heard in the nest boxes, when the attendant's anxiety or curiosity will prompt him to investigate. Remember, all movements around or near the nest boxes at this particular time must be made as noiselessly as possible. The nests must not be looked into while the young are blind, nor at any time until after the young begin to run about on the outside, at around four or five weeks of age, unless at an opportune time when the mother is out for food, and she should be closed out until after the nest is examined.

If the nest is looked into while the mother is within it, she would, during a moment of nervous excitement, kill her babies by snapping them in their heads. She would then eat them.

The period in which young minks remain blind is largely dependent upon climatic conditions. If the spring is late and cold they will remain blind longer than they would when it is warmer. However, the usual sightless term along our Northern tier of States is about four weeks. In sections farther south it would probably be not more than twenty-four days, when the nest box may be looked into with reasonable assurance of safety.

After young minks begin to run around outside the nest box, it should be examined, cleansed, disinfected, and new bedding furnished each week until they are weaned at about eight weeks of age.

The attendant should never place his hands inside the nest, nor on the lid of it at any time while the young

are blind. If a nest should be looked into to determine the number of young while the mother is out of it, the lid should be raised with a sharp hook fastened to the end of a stick; that part of it that enters the nest should not be touched with the hands because the odor from them might, possibly, excite the mother on her return, and unless each pen is provided with two nest boxes, she might become nervous and attempt to drag the youngsters out of the den in search of a more secure hiding place, and finding none, she would leave them out where they would perhaps die. If she becomes apprehensive, or if one den becomes foul, as it often does from the meat she drags into it, she would probably transfer the young to the other den, which should not be looked into, thereafter, until they begin to run about; then they may be handled without fear of arousing the mother's anxiety for their safety.

By a strange provision of nature, young minks have a very tough, thick, rubber-like surplus growth of skin on the back of the neck, much resembling a puncture patch on the inner tube of an automobile tire; the mother mink grabs them at this spot when dragging them about, as into, or out of the bath. This rubber-like patch prevents pain to the young, from the mother's sharp teeth.

If the original birth box becomes foul and the mother does not transfer her family to the other one, no attempt must be made to force her to do so, for she would surely kill them; leave all transferring to her own free will. If she voluntarily makes the shift, the deserted den should be removed immediately and thoroughly disinfected, as should be all space around where it stood. After the young begin to run about, their pens and dens should

be cleansed and disinfected every thirty days, or even with closer intervals.

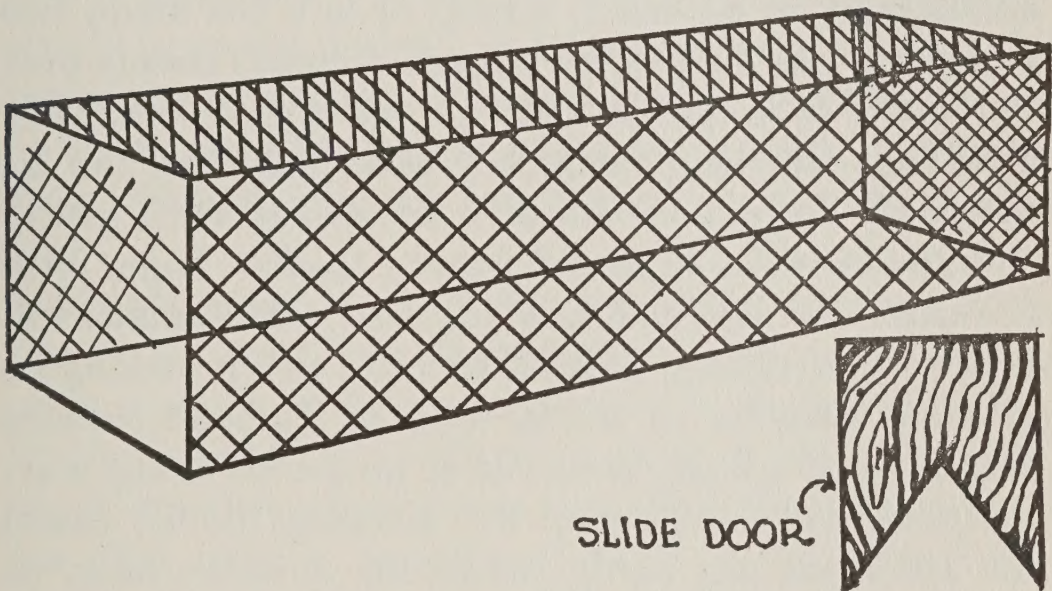
It is essential that real young minks be kept in a dry, warm den, that is especially dark; for sunlight, or even daylight, is injurious to their eyes. If they are exposed to sunlight before their eyes open they will probably remain permanently blind. They should not be handled more than is absolutely necessary, at any time, for it causes them to have dull, lifeless, unsightly furs, and stunts their growth.

It will develop in the attendant's course of observation, that these sanitary, and various other precautions are preventive of many troublesome complications in the minkery, and are also productive of finer furs upon physically stronger animals.

THE TRANSFER BOX

The attendant should have a 'transfer box' for handling or transferring minks from one pen to another. This box should be about 10x10x15 inches with a sliding door in one end of it, into which he may transfer a mother and her entire family at the same time. They are easily driven into the box by placing the door against the entrance to the nest, then as they pass out, they will run into the transfer box, the entrance to which may be closed immediately by means of the slide. Or they may be caught by placing the transfer box in one corner of the pen, then when they are driven from the nest they will seek seclusion immediately in the transfer box. This box should have a one inch mesh-wire bottom, so the animals may be driven out of it by means of inserting a small stick through the mesh after inverting the box.

An examining box should also be prepared to enable the attendant to examine his minks for sex, treatment, or otherwise. It should be made of sixteen gauge, one inch mesh wire about two and three-fourths inches wide, three inches deep, and twenty-five inches long, inside measurements, with a sliding door at each end of it. This is large enough for an average sized yearling mink to crawl into, yet it is small enough to prevent their twisting themselves around in it to the inconvenience of the attendant.



The Examining Box.

The sliding doors to this box should be made of wood or tin, with an inverted 'V' slit at the bottom edge, so that when the mink is inside, the slide may completely close the entrance without pinching the animal's tail which will extend through the slit. When it is desired to release the animal, remove the front end slide, and he will crawl out immediately.

The animals are easily driven into the examining box

by placing the open end of it directly over the entrance to the transfer box, then driving them into it by means of a small stick inserted through the mesh of the wire bottom, as described in the foregoing. The attendant should wear heavy buck gloves through which the animals cannot bite. All transfers should be made within the enclosure to prevent the possibility of escape through one of the many little mishaps that usually occur however careful the keeper might be.

It is sometimes necessary, for various reasons, to handle a mink with the naked hands. In this case the animal may be caught in a sack, or in a box about two feet deep. As long as the attendant stands closely over the box, or sack, the mink will not try to jump out. The attendant may then completely close one hand, run his fist slowly down to the animal's side and stroke it gently with the knuckles or second joint of the first finger until he reaches the jaw, as in rubbing a cat. The animal will tolerate this rubbing which it seems to enjoy, making no attempt whatever to bite as long as the hand remains closed, but if a finger is moved or projected in any way, the mink will surely snap it. Keeping his fist closed the attendant can easily stroke the animal's neck, or jaw, until he gets his fist in a position that will enable him to grasp the mink, quickly, around the neck just back of the head so it cannot bite; care must be taken not to choke the animal.

Young minks are usually weaned, by the mother, at about eight or nine weeks of age, but they will begin eating solid food when they are about six weeks old. If they are transferred to pens of their own at this time, before the fear of man has been trained into them by the mother instinct, they will always be more content in

captivity, will remain on more friendly terms with their keeper, and will invariably make better mothers.

They will appear to be rather timid, and display an unmistakable fear of their footing when they are first taken from the parental pen to strange quarters out in the general enclosure but they will soon forget "the old home and mother" and be happy in the new one without her.

If the attendant should wean the young minks prematurely, one or two males should be left with the mother for a week or so, to be sure that all of her milk flow is consumed. The reasons why the remaining young should be males, instead of females, is because the only particular advantage, or object in the early weaning is to secure more motherly females for breeding purposes, from which the progeny would be more domestic in general.

If minks are to be raised for their furs only, they should be pelted in midwinter, when in that event early weaning would be unnecessary. In fact it is better that they remain with the mother, in this case, until she thoroughly weans them; then when the time is apropos, they may be transferred alone to the general enclosure for development. The mothers must remain within their respective pens.

When young minks are first taken to the general enclosure, which should be done in the morning, they should be placed in the nest which they are to occupy, and closed within it, so they cannot run out before feeding time in the evening; their food should be placed directly in front of the nest, then the entrance may be permanently opened. They should be fed in this same place for several days until they learn to come to the

regular feeding station as prepared by the attendant for convenience, or sanitation, where the entire herd within the enclosure are to be fed each day.

It is claimed by some mink raisers that a mother mink will kill the young of another if she can get to them, while others say that she will not harm them, but will nurse them, instead. Never having experimented with this because of the risk of losing some minks, I can not say just what the result would be, but from a theoretical view, it does not seem reasonable that any nursing mammal would destroy the young of another of her own species, unless the youngsters offered for adoption were too strongly scented with the odor of man, from handling them, and even that would probably not cause her to kill them.

As the season advances, young minks will become more nocturnal in their habits, and more antagonistic, unless they are adequately fed, until eventually they will seldom be seen in daylight until just after the fifteenth of February when they are prompted by the approaching breeding season to venture out at all hours of the day in an attempt to locate vicinities in which prospective mates may be found.

DISEASES

Minks are strong, healthy, vigorous animals, extremely hard to kill because of their phenomenal tenacity on life. If uncleanly conditions, and indiscreet feeding are avoided, no destructive disease will ever appear among them.

The most common ailment among minks is a laxative condition caused by feeding them too much milk, tainted meat, tainted fish, or unclean drinking water. This

trouble is very easily determined by an observing attendant.

Remedy—Thoroughly boil and cleanse all feeding vessels, disinfect the pens, dens and nests. Give an abundance of clean, fresh water each day; do not permit them to have food of any kind for about twenty-four hours, then feed them sparingly only fresh lean beef, for three or four days, when the disease will disappear. Fresh beef is excellent for all forms of intestinal trouble.

Sore eyes will sometimes appear, accompanied by a sore mouth. If their eyes become sore, it is almost certain that their mouths also are sore. These are caused by chewing small particles of foul nesting, or by tugging at rusty wire fencing. If the rust gets in their eyes and mouth, it makes them sore.

Remedy—Thoroughly disinfect everything, then swab the mouth with a mild solution of "dip" by saturating a rag or piece of cotton that is fastened to a small stick and let them grab it in their mouths after they have been driven into the examining box. An application a day, for two or three days will cure it. If everything is thoroughly cleansed and kept clean, it will cure itself within a few days. Never swab with a carbolic acid solution, or with any poisonous remedies; they are dangerous.

Occasionally a sore spot will appear immediately above the base of the tail; this occurs mostly among females, its first appearance very much resembling a spot of mange. If it is left unattended it will develop into a dangerous sore which would perhaps prove fatal if allowed to take its course. It seems to be the favorite pastime of young minks to tease, torment, and drag the

mother around the pen. The loose skin just above the base of the tail offering the most convenient hold by which they may drag her, it is believed that they irritate it, in the beginning, with their sharp teeth; then, as she tries to prevent the youngster from getting this hold on her again, she rubs the irritated part against foul nesting, from which parasites or germs enter the abrasions, causing the sore. The disease might be caused, however, from unsanitary conditions, with which the playful pranks of the youngsters have nothing to do. When a mink is defeated in a fight it will try to escape by running, when its adversary will invariably run up and snap it in this same place, often tearing the skin, causing a similar sore to appear.

If the trouble is severe when it is first noticed, the animal should be transferred immediately to a separate pen more in the open, where there is plenty of sunshine; the sore spot should be sprayed thoroughly each day with the *dip solution* (as prescribed under that caption); it will disappear within a few days. If the disease appears on a mother when the young are large enough to eat fresh meat, she should be removed to a pen of her own until cured—the miscreant youngsters may be weaned in the meantime. All animals must be kept warm, under clean rags, after they have been subjected to external liquid application of any kind, because these reach the skin and would be very likely to cause the animals to contract colds if they were subject to cold winds before they are dry.

If everything is kept clean, dry, and thoroughly disinfected at frequent intervals, and the animals provided with clean fresh water and food daily, there will be no reason for disease of any kind ever developing

among minks. They are naturally very clean, healthy animals with iron constitutions.

SKINNING AND CURING

Minks should be skinned "cased" as explained under the caption of "Skinning and Curing." The curing process would be the same as for any other pelts.

THE RACCOON IN THE WILDS

The raccoon is the clown of the fur-bearing family because of the many amusing pranks it performs in the wilds, and in captivity. They are the most likely prospects for complete domestication, of any North American animals. They are to be found in greater numbers



in the Central, Eastern, and Southeastern States. While some raccoons are to be found on the Pacific coast, they are practically absent in the higher altitudes of the Rocky Mountain region, and in the frigid zone.

The Southern and Southeastern raccoons are of a

decidedly smaller type, with lighter colored furs of lesser value than those of the larger, darker variety found between forty and fifty degrees latitude in Indiana, Michigan, Minnesota, Illinois, Iowa, and in the New Madrid district of Eastern Missouri, where the largest specimens in America are to be found. Above five hundred thousand raccoons are trapped annually in the United States.

Where raccoons are not molested, or rigorously hunted, they move about considerably during bright daylight, but more freely after dark. They nest in hollows of broken limbs and trunks of trees as high up as possible, but never in the trunk of a tree that is hollow all the way up, with an upper outlet; this forms a flue, causing drafts, which the animals always evade. They sometimes nest in cliffs, or in crevices in high embankments, or scratch out the loose dirt from under some old stump or uprooted tree when natural excavations or hollows are not available, but they never burrow into the earth.

While they are lying around on the limbs of trees, raccoons are, apparently animals of ease and contentment, but when they are on the earth they are of an extremely restless disposition, seldom, if ever, still for a moment. Possessing all the characteristics and movements of the bear, they have often been called "tree bears" by some naturalists. They are wonderfully intelligent, and so quick to learn that they make extremely attractive pets. Raccoons are commonly known to the people of the United States under the contraction "coons"; hereafter, they shall be referred to under that abbreviation in this article.

Coons are usually found in deep forests where they

wade the shallow waters of small streams in search of such food as water-frogs, fishes, worms, mussels, turtles, or small animals that come there for water. Occasion-



Raccoons in their natural environment.

ally they roam into fields, or grassy places in search of grasshoppers, crickets, birds' eggs, or young birds. Sometimes in quest of a chicken dinner they will visit a

hen-house, in an isolated place, where they usually cause considerable commotion among the flock.

Coons are extremely fond of honey; when they find a burrow leading to a bumblebees' nest they will immediately place one foot over the entrance, letting only one bee through at a time, and killing it as it comes out; when those that are already out come back to the nest, the coon will cover the entrance with one foot so that none of the inmates can escape, then as the insect from the outside alights, to find its way in, the animal will kill it by slapping it with his unemployed foot. When the entire colony is so destroyed the coon will dig down to the nest and enjoy a meal of honey undisturbed. If an enraged bee becomes entangled in the animal's long shaggy fur during the process of extermination, the dextrous coon displays considerable skill in using his unemployed foot for a comb to dislodge the insect without permitting other members of the swarm to escape.

Coons display a surprising fastidiousness about their bill of fare; whenever possible, they will take their food to the water before eating it, and wash it with their hands, rubbing it over in the same way that a person would wash a potato, then, after they have eaten it they carefully wash their hands and face, in the same manner as a man would do.

While washing food that is to be eaten, they do not look at it, but strange to say, they continually look in a direction other than toward the article that is being washed. Before tasting food that is given to them, with which they are not familiar, they will examine it carefully by rolling it between the palms of their front feet; they neither smell of it, nor look at it during the course of examination; in fact their attention appears to be

elsewhere while they are rolling it between their palms; during this time there is an unmistakable expression of deep concentration upon their faces that is apparent at no other time. It is by this seemingly abstracted manner of examination that they determine whether or not the proffered food shall be eaten; if the decision is negative they drop the article and do not give it even a parting glance.

These peculiarities are sufficient to support my opinion that coons have a sense of smell in the palms of their front feet or, at least, that they determine in this manner whether or not an article shall be eaten. When coons are on the earth they move about almost incessantly, and run their paws into every little crevice or burrow, under logs, rocks, etc. carefully examining every obscure object, by touch only. The palms of their paws are as soft as velvet—strangely so.

The curiosity of a coon is aroused immeasurably by the appearance of anything bright, such as a shiny new coin, or metal of any kind. When a pet coon in a den cannot be persuaded to come out by offering it food, he will surely be drawn out by curiosity to examine any small bright article shown to him. If he is allowed to take it, after a moment of apparently satisfactory examination, he will hide it in some secluded nook, which he will afterwards use for a storage for all little trinkets that are given to him, or that he can steal, especially if they are bright. Coons soon learn to run their hands into the pockets of their keeper and take out anything they can find, such as money, knife, etc. which they will invariably take to their favorite hiding places for concealment. They will then peep cautiously around the corner to see if the attendant is watching them.

Coons, both young and old, are extremely playful; even without training they will do many amusing stunts with a display of intelligence that is scarcely credible. They are so well known to the inhabitants of the world that a detailed description of their beautiful markings, or physical construction is unnecessary.

Coons in captivity, when treated kindly will soon overcome their fear of man, especially if they are captured while they are young, when they make amusing and attractive pets, remaining around the house, barn, or garage, seemingly in perfect contentment until the early spring; then, in search of mates, they will stray into the luring wilds, out of which they seldom return. Their erstwhile domestic contentment, due solely to isolation from wild animals of their kindred, is diverted, if once they return to nature's environment, when their natural instincts respond to the lure of the wild-woods.

The mother coon, for self preservation, will desert her cubs, if closely pursued while running in the wilds with them, preparatory to weaning. When the cubs realize that they are helpless and about to be captured, they rear upon their haunches, place their hands over their eyes and cry, in the exact manner of a frightened child; finally they will spread their fingers apart and peep from between them, at their captor, pitifully begging for their lives. But after they are taken in charge and handled gently they become extremely sociable and make amiable pets until they are about one year old, after which time, if they are deprived of association with the sexes, they become troublesome, often biting their master severely when he attempts to handle them. When they learn to be led by a chain, as dogs are led, they seem to enjoy it, and are perfectly harmless.

In the captive state, where coons are sometimes retained in pairs, the male is so considerate of the comfort of his mate that in cold weather he will sleep with his back jammed into the entrance to the den, to exclude the cold air. Also, he will bring food to the mother coon while the cubs are small; under no condition will she permit him to enter the den; she meets him at the entrance and accepts the food; he almost invariably sleeps on top of the nestbox, from which point he warns her of approaching danger by his characteristic little chitter, which sounds very much like a muffled chain rattling. It is doubtful if a father coon in the wilds, with his polygamous tendencies, would be such an exemplary husband; the proximity of dens occupied by coons in captivity offers partial explanation, if not the whole of it, for this devotion of the male to his mate.

The claim by some authorities that coons in the wilds always mate up in pairs for the season, has a poor foundation to support it.

THE RACCOON IN CAPTIVITY

RANCHING

That coons may be raised successfully in captivity, is long since proved through several systems of ranching, all of which appear to be equally good. Coons being very active animals, they should have as much runway as possible; however, a pen twelve by twelve feet, would suffice for a female and her family which may remain with her until time to take their pelts in the winter, or a pen about twenty-five by fifty feet would accommodate two females and their families. But it is better that the cubs be released within a large enclosure for develop-

ment as soon as they are weaned. While their furs will prime in December following their birth, they are really not at their best until the animals are about twenty months old, or during the second mid-winter.

Good prime coon skins always find a ready market awaiting them, at attractive prices. In addition to the sale of the pelts there is also a steady demand for the flesh, which always commands a good price, particularly in cities having a large percentage of Negro, or foreign population. The sale of the animals for pets, or for breeding stock always brings a price far in excess of market prices for the flesh and pelt combined, and with the rapid developments in the fur raising industry, the demand for live animals is increasing yearly.

Coons sometimes disappear from their enclosures leaving the attendant at a loss to understand how the escape was effected. In many instances they return, climb the posts from the outside, re-enter their pens and never escape again. A satisfactory explanation for these mysterious disappearances would indeed be difficult to render; it is believed by some that a depredatory owl may have carried the coon for a short distance until the animal was able to administer a bite on the bird's thigh, or get a grip with its powerful hands on the bird's wing at its intersection with the body, bringing the kidnaper to earth, where the coon would immediately become master of the conflict, kill the owl, and eat its flesh.

Being unaccustomed to hunting its food in the wilds, when the coon became hungry again it would naturally return to its pen where it had been accustomed to procuring its food with the least resistance, unless it was successful in finding an abundance elsewhere.

In the event of gaining its liberty by a bite, the coon would of course be dropped to earth, but as owls always fly under the limbs of trees, and never over them, the coon would not have a great distance to fall.

A fall from a considerable height merely stuns a coon for the moment, then he will get up, shake himself dog-fashion, and be on his way as if nothing had happened, apparently none the worse for his sudden stop on solid earth. That a coon may survive the fall from a great height is evidenced by a number of instances in each of which two coons were seen to adventure to the near extremity of a small limb, far up in a lofty tree. The one farthest out attempted to turn back, but the limb being too small to permit of their passing each other, they fought to maintain their right of way, when one fell to the ground without injury.

The theory has been advanced by some authorities that as coons nest in trees, and as foxes nest in the earth; one being of largely arboreal, and the other of purely terrestrial habits, that these two animals might be raised successfully within the same enclosure. It would appear from the standpoint of reason that as both are carnivorous animals, each of a contrasting species, such an attempt would meet with certain disaster, for either would readily devour the young of the other.

While I have never witnessed a fight between a coon and a fox, I believe it would be a fierce one, in which the coon would be victorious, because he would not surrender to his adversary. If they were to get into the water during the course of conflict, it is almost certain that the coon would win, for they frequently overcome the most powerful dogs in water battles.

If coons are too closely cornered they will attack men;

when they lay their ears completely back it is time to accord them respectful consideration for they are then ready to fight. When once they get a firm hold with their remarkably strong hands the most powerful man cannot free himself from the clutch of their piercing claws. Were it not for his overpowering weight and height, no hunting dog could win a dry-land battle with a coon.

ENCLOSURES

The general enclosure for a coon ranch may be built of sixteen gauge, two inch mesh, galvanized wire. It should be at least five feet high with inside turn-in of boards or smooth metal at the top, extending inward about eighteen inches; otherwise the animals would escape by climbing over it.

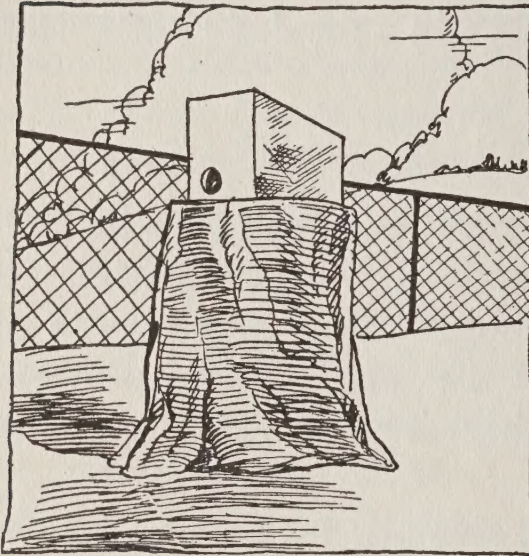
Coons are not burrowing animals; for that reason the trench in which the fence is set need not be more than six inches deep, with an eighteen inch turn-in at the bottom. Or the ditch may be dispensed with entirely by laying a three foot mesh-wire on the surface with one selvage intersecting with the fence. The entire carpet wire should then have a little dirt thrown over it to hold it in proper place, and for protection to the animal's feet. (See General Fence and Pens Construction).

Individual breeding pens for each female should be built within the general enclosure. They should be about twelve by twelve feet, with the usual turn-in at the top. There should be a stump, or a sawed off part of a tree trunk in the center of each pen, upon which a nest box should be placed, to keep it off the ground. Coons like to nest as high as possible. If several coons have access to the same tree, the tree will soon die and shed its bark

completely; caused probably by the frequent punctures of the animal's sharp claws.

If the general enclosure takes in a part of a lake or small stream it would provide one of nature's own haunts for the coons; they like to play around in shallow water

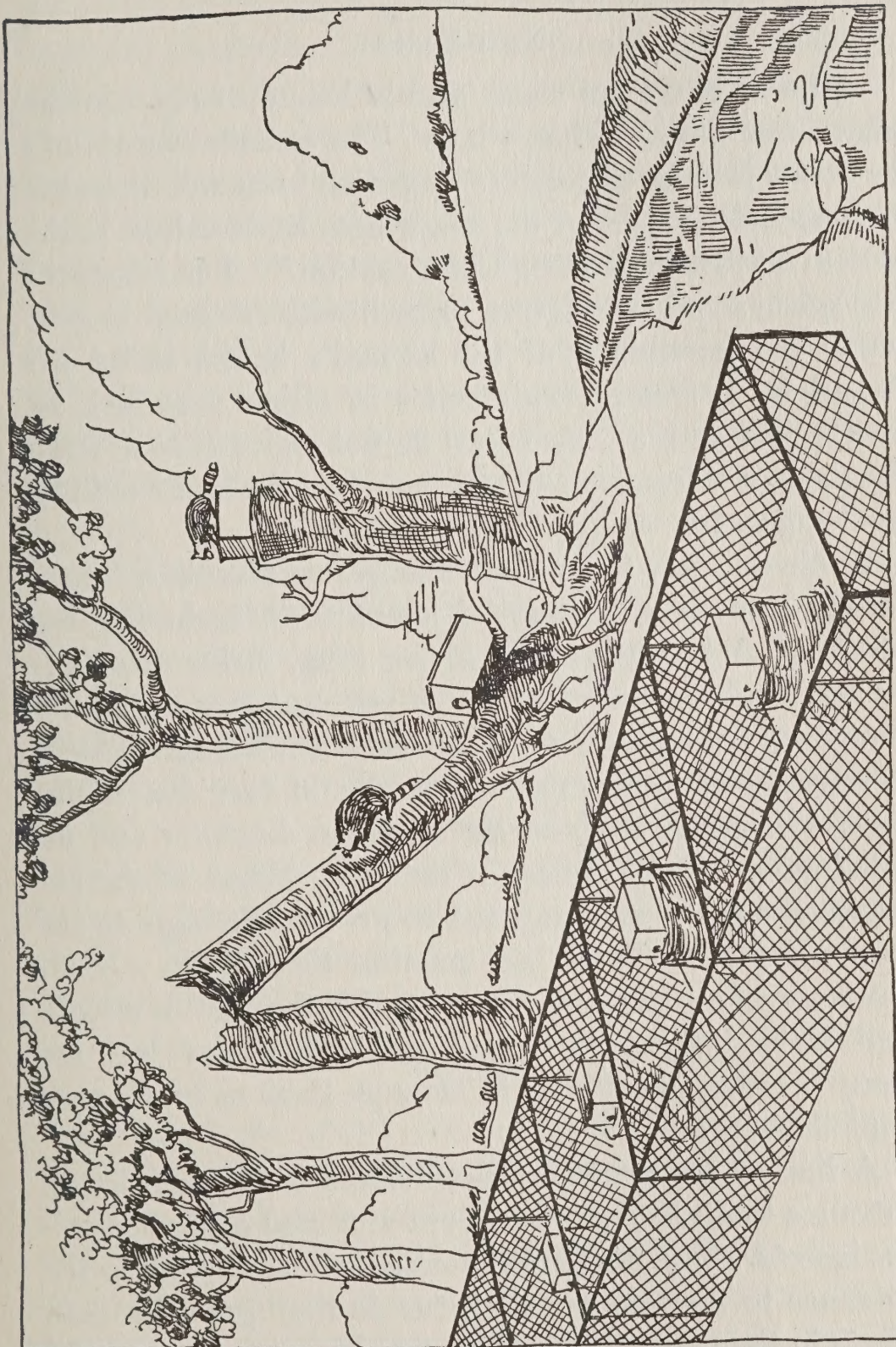
where they hunt continually for food. They want fresh water in which to wash their food, hands and face, and they must have it also for drinking. The finer specimens of coons are developed in the general enclosure where it is possible to produce furs superior to any from the wilds, because of selective breeding, and



Stump, for the nest-box.

proper feeding, which assists nature in its course of development.

A number of trees cut or sawed partly off, high up, and allowed to fall, the trunk end remaining attached to the stump, furnish an excellent playground for coons. Also, nests placed on top of these stumps, or on the inclining parts of the fallen tree tops furnish a perfectly natural condition contributing greatly to the comfort and contentment of the animals. They also like to run and climb on inclining logs, especially where the logs lead out into a stream, or lay across it. All trees with "hollows" should be felled, or the coons will nest in them to the inconvenience of the attendant; they enjoy the use of the fallen logs fully as well.



Raccoon ranch completely equipped for the semi-natural developing system.

NEST-BOXES

All nest-boxes for coons should be constructed in the manner of a box-within-a-box. The outside box should be about four or five inches larger on each side than the corresponding sides of the inside box, as described in the article on "Animal Dens Construction." The intervening space should be tightly packed with sawdust to preclude the possibility of the animal's health being affected by extreme eventualities in either very hot, or very cold weather. As coons do not make beds to keep themselves warm, an ordinary merchandise box would be inadequate for the needed protection.

Each den must be large enough to accommodate a family consisting usually of about four, including the mother. A box 11x11x20 inches long, inside measurements, would be sufficient. If it were too large the body heat from the animals would not be great enough to keep it warm. The entrance, which should face the south, should be circular, about six inches in diameter and located at one (side) corner of the box. Edges of the entrance should be sandpapered to prevent damage to the furs while the animals are passing through it. Nest-boxes may be placed on the ground if they set in a high, well drained place, where they will be kept dry, but, for many reasons, it is better to arrange them as high up as possible.

A line of tar about an inch wide should encircle the entrance to all boxes to keep out ants and other obnoxious insects. The tar should not come near enough to the entrance to tear the animal's fur as they pass through. Nests in the general enclosure should be of the same dimensions and design as those described for the breeding

pens; two or three adult coons will nest together in these boxes, for warmth. These boxes should rest on stumps, well up from the ground, or be wired to the trunks of trees, and so arranged that when the attendant wants the coons he can take the box with the animals in it.

All nests should have the lids hinged and latched down, so that the coons may be removed easily; otherwise, it is almost impossible to get one out of a box of any kind until he is ready to come out, of his own free will; because of the excitement occasioned by an unsuccessful attempt to remove him, it is likely that he would not attempt to leave his nest until after dark, when all is quiet.

All large trees within the general enclosure should have the turn-in adjusted around them immediately above the first limb, so the coons may have as much climbing space as possible, yet, not be able to get out of reach when they are wanted. They may be driven back from the limb, into the nest, with a long pole prepared for the purpose. On trees to which nest-boxes are not attached, the turn-in should be placed below the first limb, because the animals would refuse to be driven to the earth. The obstinance of coons is remarkable, with no known means of overcoming it.

FEEDING

Inasmuch as coons are omnivorous animals, they thrive on almost any food. They eat meat of all kinds, raw or cooked, also vegetables and fruits of all kinds, raw or cooked. They are fond of young birds, eggs of any kind, poultry, mice, muskrats, water-frogs, grasshoppers, crickets, fishes, crawfishes, mussels, turtles, grapes, berries of all kinds, and watermelons; there is

nothing better for them than tablescraps, bread with milk, or cornmeal mush with milk. They also like corn while in the milky stage.

All adult coons should be fed at least once a day except during hibernation. A mother coon should be fed morning and night until about the time the cubs are to be weaned. While one feeding a day thereafter would suffice for the mother, the cubs should be fed twice a day; for it is essential that they become very fat in the fall, or early winter, in anticipation of inclement weather, because it is upon this earlier accumulated fat that their constitutions are kept at the high standard necessary to produce good furs.

All feeding troughs or pans, should be kept clean; fresh water should be furnished daily, especially during summer months. An unclean condition is a vehicle that carries many disease germs with it.

Raw meat with carrots ground in it, should be fed each day for about two weeks before pelting time, to all coons that are to be taken for their furs. They should have, also, a raw egg each day during the same period. Eggs and carrots are both wonderfully instrumental in producing fur, as well as contributing largely to the glossy, silky effect, that has so much to do with the sale price of the pelts.

All mother coons with cubs should be fed liberally with fresh milk each day until about the weaning time, to assure sufficient nourishment to the youngsters while they are growing. The milk diet properly should begin a few days before the young are born, supplemented with the usual rations which should contain caloric values sufficient to promote their growth. (See Caloric Food Values, on a subsequent page).

Beef scraps or rabbit meat make good daily rations for coons, especially when cooked with cornmeal mush. They should have fresh bones of chickens or rabbits, occasionally, on which the cubs like to chew. They gnaw off and eat the joints, the lime contents of which is highly beneficial in building up strong bones of their own. For an all round meat diet there is nothing better than fresh rabbit, or a live one released in their enclosure occasionally, where they may catch it in their own way; this provides good, healthy exercise for the animals, and they thoroughly enjoy the chase.

Coons are semi-hibernating animals, especially those that are habitues of our northern tier of states, where, like many other carnivora they eat heavily in the early fall to accumulate surplus fat upon which the bodily strength is maintained during extremely low temperatures, when they do not come out for food for twenty to thirty days, perhaps longer; during this time the physical strength and vitality are kept up to the normal by the oil from the fat previously acquired. Through small ducts leading from the fat deposits, this oil reaches the soles of the animal's front feet, from where they suck it into their stomachs.

I know of no scientific analysis ever having been made to establish this fact, but my personal observations and experiments to determine the reasons why they constantly suck their front feet during the period of semi-sleep until the fatty accumulations disappear, establishes a foundation sufficient to support my belief that this theory is not far amiss. During extremely cold weather I have seen them with both front feet in the mouth, apparently remaining in one position for several days. When the fat accumulations disappear at the end of

winter, they go out on a hunt for food, but they do not again put on flesh until the following fall. If they are fat during the early spring season they will not breed with any measure of certainty.

Every fur-bearing animal will eat fish, and milk, but these should not be given at the same meal; this combination sometimes proves very injurious by developing a slight ptomaine poisoning from which the animals become very sick.

BREEDING

Coons are polygamous mammals that breed but once a year, usually about the last week in February. Occasionally a male and a female coon will "pair off" for the season; however, as a rule, one male will associate himself with five or six females during the breeding period. Their young are born about the first of May, or perhaps a little earlier if the spring is early. The young range from one to six at a litter; the average would probably be not more than three, for the maximum of six is a rare occurrence.

About January 1, each male (breeder) should be placed in an individual breeding pen, as far from the females as possible, where they will be completely out of his sight, so he will not become fascinated with any particular one. Then, at breeding time, one female should be taken to him each day. She will be a little inclined to fight him at first; if she is persistent in doing so, she should be removed and returned to him, or to another male, within a few days, but another female may be brought to him immediately.

To prevent undue excitement in carrying the females to and fro, they must be carried within their dens, to the

male's pen, otherwise, the attendant would experience considerable difficulty in handling them advantageously. This is one of the reasons why the nest boxes should be made portable.

Unless coons are mated and retained in pairs, the male coon should never be allowed to gain sight of more than one female at a time during the breeding season; if they do, it is likely that a full measure of production will not be secured because of the inclination to pair off. The breeding usefulness of coons is from twelve to fifteen years.

I have retained two female coons in a pen with one male for two seasons, during which time production was procured from only one of them, and from the same one each time. The other female mated readily when she was associated with another male. On a more recent occasion I retained two females with one male, and production was procured from only one of them.

After all females have been mated, they may be released again within the general enclosure by carrying them, in their nests, back to their original places where they may remain until just before time for the young to arrive, when they should be taken to their individual pens where they must remain until the young are weaned; then all except adult male breeders may be released within the main enclosure to develop their furs.

Adult male breeders may be released within the main enclosure, for additional exercise and freedom, as soon as the females have been retired to their respective pens to raise their families, but not until then should the males be released, because they would continually torment the females during spare time when they would not be fighting among themselves. In the absence of fe-

males they would not fight so fiercely. Furthermore, the number of males would be so few when measured with the space they would have, that serious results from fighting would be rather remote, because when one is "licked" he runs away rather than stand and take more of it. However, they may be retained indefinitely within their respective pens, singly, without fear of detrimental results.

Both males and females should be comparatively thin at breeding time, but commencing a few days before mating, both should have a liberal feed of raw beef each day, supplemented with warm oatmeal and milk. The beef should be fed in the evening; the mush, or oatmeal and milk should be fed in the morning. All mothers should have milk twice a day until the young are about to be weaned, or until they begin eating solid food; otherwise she might not be able to nourish them properly, and a scrubby family would be the result. A raw egg each day, before mating, given with their mush and milk, is also very effective in producing good breeding results; an efficient attendant would not fail to observe these little essentials.

That a strain of solid black coons can be produced by selective breeding has been established by at least three ranchmen, one of whom is in Ohio, one in Nova Scotia, and the other in Minnesota.

The larger, darker, finer specimens should be retained for the next year's breeders. Breeding these kinds to one another continually will soon build the herd to one of supremacy. Inbreeding should be avoided at all times to maintain normal stamina of the animals.

CARE OF THE YOUNG

Beginning about ten days before the time that young coons are to be born, the prospective mother should have about a teaspoonful of lime-water in her milk each day. This allowance of lime to the mother should continue until the young are about four weeks old, or until they learn to lap milk from a pan, when they should have about a teaspoonful for each cub in their total milk allowance each day until they are weaned, or until they begin to eat meat and chew small bones from which they will get the requisite amount of lime that is contained in the bone joints, to assure large strong bones within themselves. Lime is a bone builder.

Lime-water at infancy supplies the food substance required to build strong bones within the growing cubs and prevent rickets, or weak joints, to which all ranch raised animals are subject unless the needed lime is furnished by the attendant. All carnivorous animals procure this lime daily in the wilds from chewing the bones and joints of smaller animals upon which they prey. It is supplied to the embryo and to the infant cubs through the mother's milk during lactation.

No special feeding routine is necessary for young coons if the mother is properly fed as described under the caption "Feeding." She will teach them to eat solid substance at weaning time; but the attendant should maintain a strict vigilance over them at this crucial period to be sure that they do not suffer a radical change in diet which cause indigestion and from which intestinal troubles would arise.

Young cubs should not be handled until they begin to come out of the den of their own accord, and not

then unless necessity demands it, or unless it is desired to make house pets of them, because the more they are handled while they are young, the less attractive specimens they will present at maturity. Yet, because of their playful amiability, the temptation to fondle and pet them is almost irresistible.

KILLING, SKINNING AND CURING

Raccoons may be killed by the anaesthetic method, as described under the caption "Killing Fur-animals." Never let other coons see them taken or killed. They should be removed in a sack, or in the portable nests, to a place completely out of sight of the others; if not, the other coons will surely know what is being done, and will become nervous and excited, probably re-acting unfavorably upon them at the next breeding season.

Coons should be skinned and cured "open," that is, in the same manner in which one would skin a cow. First, cut the skin around the ankles of all four feet. Then slit the skin down the outer edge of one hind leg to the base of the tail, around the tail at the under side, and up the other leg to the point where the skin is cut around the ankle. Then slit the tail skin, at the under side, completely to the end of the tail bone so it may be removed entirely, otherwise, decomposition would probably take place, causing the tip end tail-hairs to fall out, thus greatly depreciating the value of the pelt.

Now, slit the skin down the middle of the belly completely to the end of the animal's chin, and proceed to flay it back as one would do in skinning a cow or sheep. A small amount of table salt pushed down into the pocket formed by extracting the tip end of the tail-bone, will prevent the remaining particles of flesh from de-

composing for it is quite difficult to open the mouth of the cavity wide enough so that sufficient air may enter to permit it to dry quickly. Care must be taken not to stretch the nose-skin; the elongated nose is indicative of southern stock, which has a lower valuation.

Next, pull each pelt over the stretching board, flesh side out, as nearly square as possible, and tack it on so it will dry in that shape without wrinkling or shrinking. The tail slit may be held open with a few wooden slivers adjusted horizontally from edge to edge of the skin, so the interior will dry quickly. The pelts must not be overstretched.

After the pelts are adjusted to the boards, scrape off all adhering flesh with a dull edged instrument, and hang them to dry, in a cold shady place, free from moisture. When thoroughly dried out they are ready for shipment. Tanning should not be attempted because the fur dealers prefer to do their own tanning at established tanneries.

Bundle the pelts so that the flesh side of one will not come in contact with the fur of another and soil it.

Neither salt, alum, nor solutions of any kind should be used in curing pelts.

DISEASES

Coons readily contract pneumonia; therefore the necessity of dry, warm, draftless dens, which are almost positive preventives of the disease. They are not generally susceptible to other fatal diseases. They are subject to laxativeness occasionally, due, perhaps, to tainted meat, or an over-feeding of green corn or new vegetation in the spring when they are not accustomed to it. In such cases, if the animals are not fed for a period of

twenty-four to thirty-six hours, the trouble will disappear automatically.

If they get mange, disinfect and dip. (See Mange on Animals).

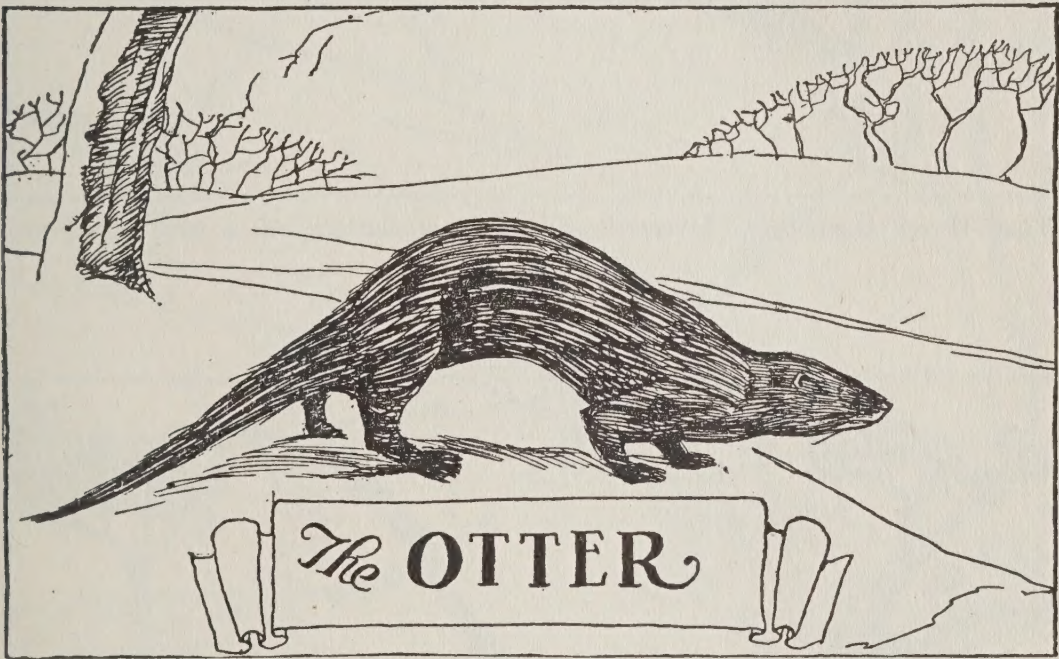
If vermin attack them, disinfect and dip or dust well with an insecticide. (See "Vermin on Animals.")

If coons have pneumonia, a little castor oil, a warm, well ventilated, dry den and a hypodermic injection of oil of camphor in the under side of the hind leg just above the hock will cure them. (See "Pneumonia in Animals").

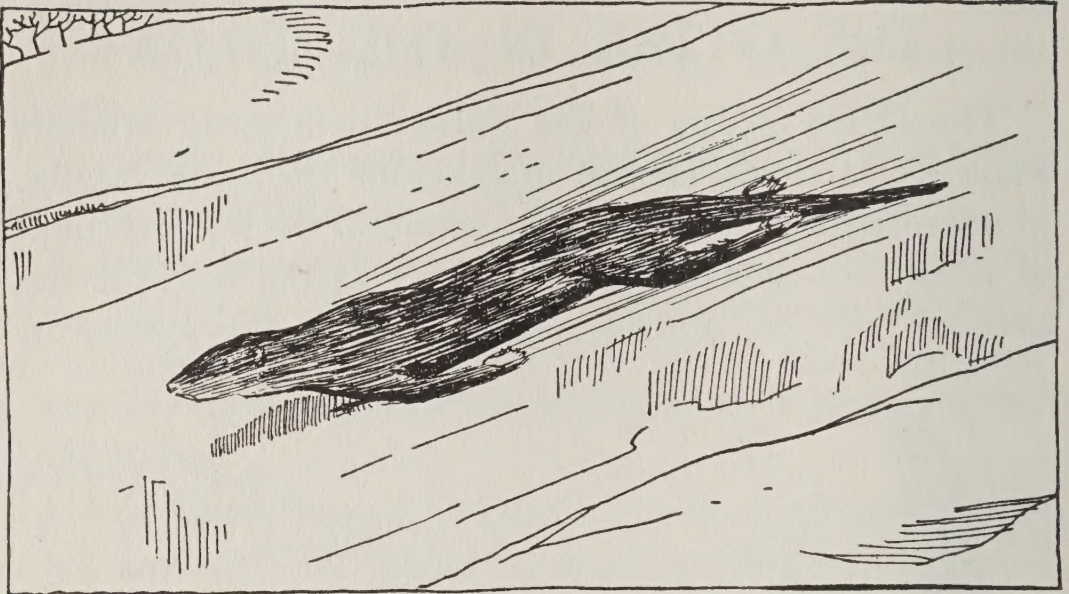
If they have worms, administer a dose of worm capsules, the same as would be given to puppies. These capsules may be obtained at almost any drug store.

THE OTTER IN THE WILDS

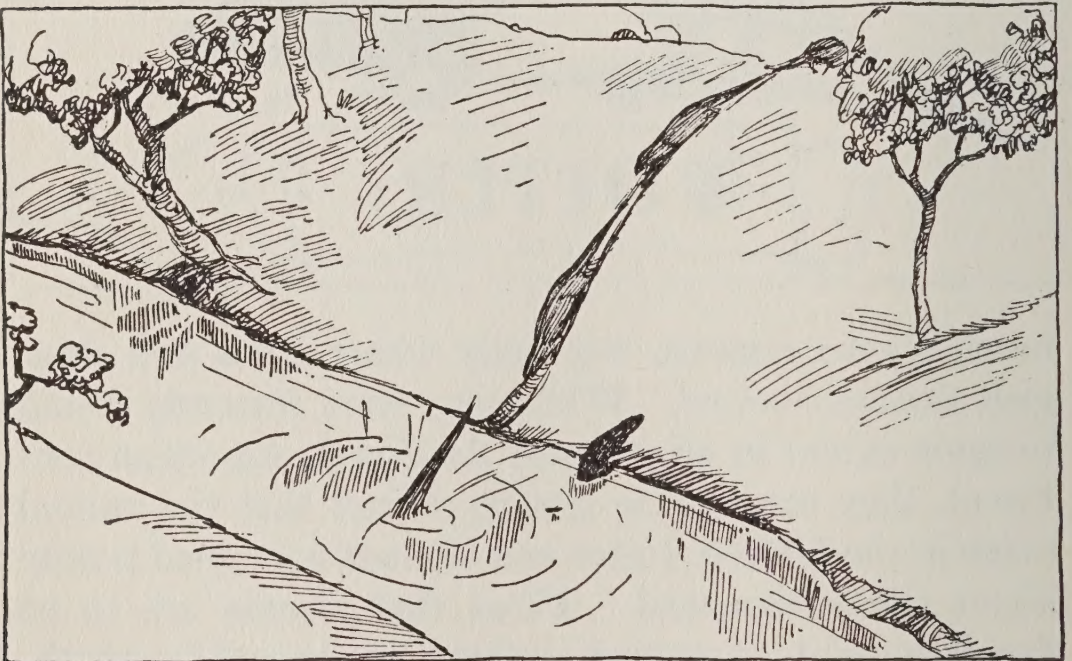
The Otter is one of the finest fur-bearing animals known. It is the largest member of the mink family, of aquatic nature, and is to be found in the low altitudes of nearly all parts of the world above the thirtieth degree of latitude, and to some extent in the valleys of



mountainous regions, especially where lakes and sluggish streams abound. While they were formerly found to some extent in all parts of the North American continent, they are now so nearly extinct that the annual catch in the United States and Canada combined is only about thirty thousand. Those that remain are to be found in greater numbers, perhaps, in some of the southern states. Quite a number are to be found also in Newfoundland, Alaska, and in the milder parts of the Canadian forests.



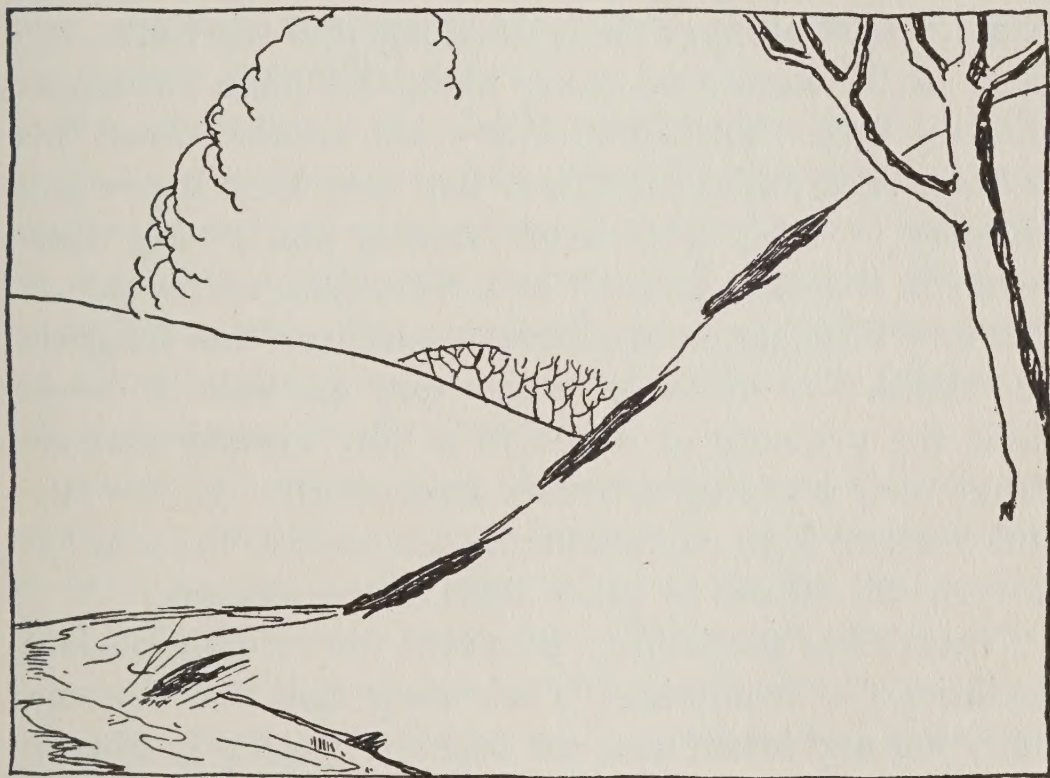
They throw themselves forward and slide on the ice, as a boy would do with a sled.



"Shooting the Chutes."

While there is but one species of the otter in the United States, it varies somewhat in size and color, due probably to geographic location and climatic conditions in their respective habitats.

Not a great deal is known of otters other than that they display almost human intelligence in exploitation of their playful pranks. While these animals are wonderful swimmers, they are poor runners; yet, they are



Coasting down a snow covered mountain side.

able to make considerable time along frozen streams by running and throwing themselves forward on their bellies, then sliding on the ice as far as the impetus will carry them, exactly as a boy would do with a coaster excepting that the otters assist the forward movement a little by an occasional swimming stroke with their front feet, on the surface of the ice.

One of their favorite forms of amusement is provided through their own ingenuity: Selecting a long, sloping embankment leading down to the water, they commence at the summit of the slope to push the dirt back slightly to each side, forming a little trench or chute leading down to the water's edge. From running up and down this trench with their wet furs, it becomes very slippery; then the playful little animals will amuse themselves for hours by running up the bank and sliding down the chute, which plunges them headlong into the water, exactly as the natatorial chute plunges human swimmers into the pool. The otters follow one another down this chute in such rapid succession that they keep it wet and slippery. They also enjoy sliding down long snow banks in the same manner as a Norseman on his ski.

These little chutes are known to hunters and trappers as "slides," by means of which they are able to determine the presence of otters in a hilly vicinity and arrange their trapping activities accordingly. In low altitudes where high embankments are absent, the trapper governs his efforts by other signs of the animals.

Nature has generously provided otters with efficient facilities for swimming: Their long tails are horizontally flat and broad near the base; narrowing gradually to a decided point at the end; this renders them infinite service in guiding their course through the water.

A broad cutaneous expansion connecting their hind toes form a completely webbed foot by means of which their bodies are swiftly propelled through the water. Their short strong legs are so loosely jointed that they can turn them in almost any direction while swimming. They have very short ears, and their noticeably flat heads are bejeweled with sharp, piercing, bullet-like

eyes, indicative of their characteristic viciousness; yet, with all the apparent keenness of their black eyes, there is every indication that the animals have unusually short vision.

Otters attain such remarkable speed through water that they will travel many miles and return during a single night; at no time venturing far from water. They travel mostly under the ice during extremely cold weather and feed largely, if not wholly upon fishes until the weather moderates when they will venture upon land for a diversified ration.

Sometimes they nest by burrowing into banks of the streams they frequent, but generally they prefer some crevice or natural excavation; occasionally they will nest in hollow logs, or under an uprooted stump if they are near the water's edge, or else they will occupy the house of a beaver after they have murdered the little family, of illustrious energy, that built it.

Some authorities claim that as otters and beavers are very close friends, an otter frequently pays a social visit to some beaver family when all of them will nest peacefully together in the same den. While this may be true, the nature of it is so purely contrary to the known customs of every other species of the wild animal kingdom, it most assuredly leaves considerable room for doubt.

While I am without established facts with which to discredit this theory, it seems, from a point of reasoning, to be as barren of foundation as the generally prevalent belief that prairie-dogs, owls, and rattlesnakes nest together, happily, in the same den. From my long actual experience and close observation in the domain of the prairie-dog, on our far western prairies, this claim is to me so utterly absurd, and so barren of fact, as to be akin

to child's play. Various authors have written numerous articles on this subject from time to time, in which they have abandoned the statement of facts in order to satisfy the urge, and picturing power of their imaginary minds, presenting the delusion as being a condition of fact, rather than fiction.

The otter is purely a carnivorous animal, and should he visit a beaver house I am inclined to believe that his "ostensibly" social visit there would be for the sole purpose of devouring any young beavers that might be found within it; just as the rattlesnake or the owl visits the burrow of the little prairie-dogs for the purpose of swallowing, or eating the young.

It is generally believed that otters feed entirely on fishes—while it is true that they do eat fish to a great extent, they do not confine themselves to it by any means. They are exactly like the mink in this respect—eating water-frogs, turtles, fishes, muskrats, mice, rabbits, woodchucks (called "groundhogs"), eggs, birds, snakes, and, unquestionably, young beavers when they can get them; it would be wholly the antithesis of sound reasoning to presume that they would not do so.

I recall one instance where a house-cat got into the enclosure of three young otters that were barely weaned; when the otters tried to capture the cat they were promptly slapped in the face with her sharp claws until they found it necessary to employ other tactics. They then proceeded by running around the cat in half-circle fashion until they worked her onto a slight ledge of rock overhanging the water, then, as one of the otters dived to a point directly beneath the edge of it, the other two ran against the cat, simultaneously, bumping her off the ledge into the water. The otter, in the water, immedi-

ately pulled the cat under and drowned it. They then dragged it out of the water and upon the rock from which it had been so recently ejected, pulled off its skin, glove fashion, and ate its flesh.

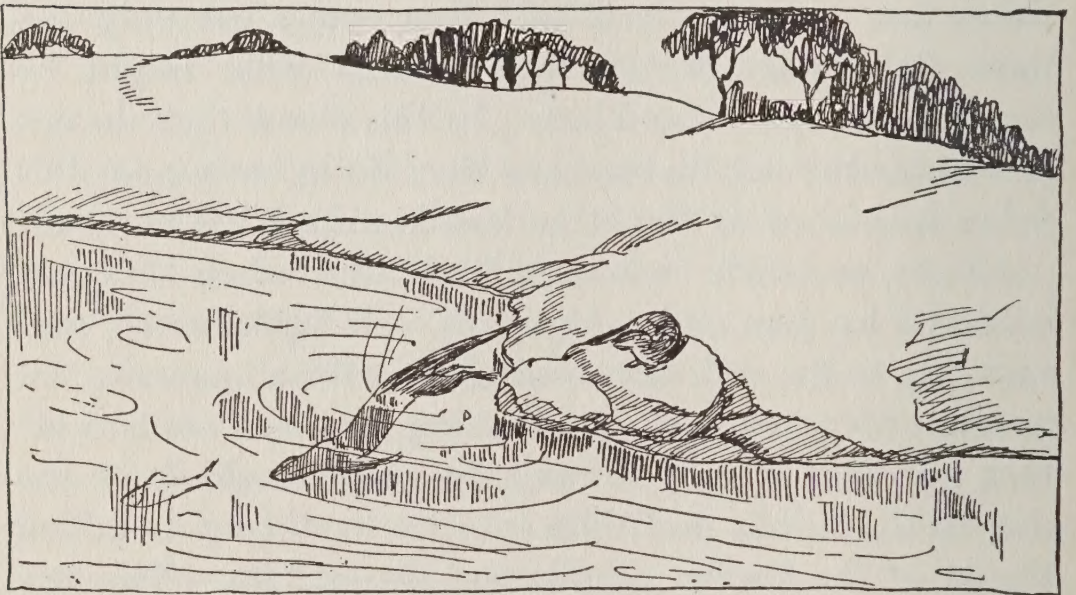
When eating fish, otters always commence at the tail, eating the flesh as they come to it by stripping it backward, never otherwise; because the needle ends of the bones all point back toward the tail; in so eating, the otters may strip the flesh from the bones without giggling their mouths. In the waterways of the wilds where fishes are plentiful, it is said that otters eat only the thick flaky part of the flesh around what might be termed the fishes' shoulders. In this event they do not encounter the needle bones as they do in eating smaller fishes furnished by the attendant in stipulated portions.

Otters are such vicious animals that when they are cornered by man or by dogs they will fight fiercely and savagely to the end, never submitting for a moment. In nearly every instance where a dog has been seen to attack an otter, near a stream, the otter would force the dog to the brink, push him into the water by a sudden thrust of the bodily weight, and drown him. This has been of so frequent occurrence that trappers and hunters who are familiar with the tactics of the beguiling otter do not allow their dogs to attack them.

When full grown, the average otter is from three and one-half to four feet in length from tip to tip, and weighs between twenty-five and thirty-five pounds. Physically they are *King of the Fur-Bearing Kind* because their surpassing strength, and activity in the water renders them superior to any other fur animal, man is the only enemy over which they have concern.

Otters are vicious fighters when they are first cap-

tured, but if they are taken when comparatively young, they tame very quickly, and become peculiarly submissive to the kindness of their keeper. They may be taught to do things with almost human obedience; they are so adept at learning that it is quite an easy matter to teach them to go out into the streams or lakes and bring in fishes for their masters. When an otter brings in a fish he will have an unmistakable look of elation at having accomplished his master's wishes, as he proudly lays the



No fish can effect its escape from an otter.

fish at his feet; he expects to be petted for it, and seems to enjoy the fondling immeasurably. They swim with such remarkable speed and agility that when a fish is once sighted, it is never successful in effecting its escape from the otter's celerity.

Some of our aged Indian trappers tell us that otters have glands that could reproduce the bloom of youth in our grandfathers' faded cheeks. If this were an established fact we would be able to boast, with exalted pride,

of visits from monarchs and illustrious celebrities who would brave the stormy seas in antiquated craft of the Christopher Columbus period (to study animal nature ???) and whose incidental purchases would enrich the ranch and divide the current honors with "Sir William," the jealously enraged barn-yard goat.

THE OTTER IN CAPTIVITY

RANCHING

Otters are polygamous, aquatic mammals, that can be raised successfully from a remunerative standpoint. They do not breed very readily in complete captivity, especially when in zoos, but this detracting feature could be overcome completely under the semi-natural conditions as described for the muskrat, since they tame so easily and are so wonderfully quick in recognizing the kindness of their keeper. Their pelts always command a high price, and the demand for them is so great that it can never be supplied.

Otters bring exorbitant prices for breeding stock and for zoological gardens; the demand for these purposes is very great. They offer, by far, the most likely prospects for successful fur raising in the South, because their furs develop normally in nearly all climates north of the thirtieth degree of latitude, or in America, as far south as central Florida, especially where they have access to deep water.

It is only during winter months that their furs prime, and, inasmuch as all inland deep waters of America are of nearly a uniform temperature throughout the winter, the otters' fur develops normally in nearly all localities.

If under semi-domestic conditions they breed normally, then a remunerative enterprise in raising them could be developed by the simple creation of an economical food supply and a fuller understanding of the essentials for developing each year's production to maturity.

Otters raised in captivity will usually permit their keeper to lift them by the tail, but as they have great strength in their tails the performance is accompanied with considerable danger to the lifter; it is advisable to use transfer boxes in handling them, for their bite is extremely lacerating—safety first.

ENCLOSURES

Enclosures, as well as all other accommodations within the ranch, may be constructed in exactly the same manner for otters as for muskrats, except that the fence should be about five or six feet high, of sixteen gauge, two-inch mesh, galvanized wire with both top and bottom turn-in as a precaution against their escaping. While otters can climb, and burrow, they are neither climbing, nor burrowing animals.

Under the semi-natural plan, all feeding should be done in the feeding pens, as described in the muskrat article, and the animals may be taken and proportioned in exactly the same way.

Propagating otters under complete control of all breeders, by means of the breeding pens system as described under Plan Number Two of the muskrat article, has never been tried out, that I know of, but there is every reason to indicate that it would be, by far, the most productive, as well as offering innumerable advantages that are explicit in the context.

NEST-BOXES

Nest-boxes for otters should be about 12x12x24 inches long, inside measurements, and constructed in the manner of a box-within-a-box, as described and illustrated under the caption of "Animal Dens Construction," and placed in close proximity to the water's edge where it would be reasonably sure that they would not become inundated in the event of a freshet.

The entrance to the nest-boxes should be from the end facing the water, circular, and about six and a half inches in diameter. A little hay and dirt should be thrown over the boxes to give them a natural appearance. The animals will keep their nests clean.

FEEDING

Otters feed largely upon fishes, frogs, muskrats, turtles, or any other small animals that they are able to capture in the immediate vicinity of the lakes and streams they frequent. Fishes and muskrats probably furnish the greater part of their meat diet because they are more commonly found in water, where the otter is king of the aquatic kind. They eat some vegetables and will readily learn to eat mush with milk, oatmeal with milk, stale cornbread with milk, animal biscuits, and table scraps.

There would be no better plan for successful otter production than to raise rabbits and muskrats in numbers large enough to derive a profit from their pelts and flesh; the offal from these animals, and parts of the flesh that would not be sold at the market for table use, would furnish the entire meat supply for the otters. Otters, like any other fur-bearing animals, should not be fed

more than they will clean up at each meal; overfeeding is probably more harmful than beneficial.

Mother otters are very attentive to their young; they will care for them, and wean them in their own way, to a much better advantage than if an inexperienced attendant should attempt to assist her.

While it is true that young otters permit their masters to handle them as he would a puppy, it is unquestionably the better way to handle them only when absolutely necessary; yet, he should use every opportunity to cultivate their friendship as much as possible, as a reasonably certain prelude to better breeding results, and more attentive mothers for foundation stock.

BREEDING

Otters breed but once a year, usually about the last of February or around the first of March. Their families arrive about the last of April in litters ranging from three to six in number, all of which will breed at the next mating season following their birth. They are polygamous animals; one male usually associating himself with five or six females during a mating season, and for this reason the animals should be retained in breeding units of about five females to every male.

The individual breeding system as explained in "Plan Number Two" of the muskrat division would unquestionably afford the attendant a better control over his animals and assist materially in selective propagation by means of the sectional breeding units. Yet, the semi-natural plan "Number One" of the muskrat article, would undoubtedly prove to be a profitable one.

Until the attendant acquires a better knowledge of the murderous inclinations of the father otter, it would be

advisable to isolate him from the company of the mother and her young; it might develop with further experience, that this precaution is unnecessary, but it is not advisable to risk the loss of a valuable season's litter merely for the sake of experimenting.

DISEASES

Inasmuch as no destructive diseases have ever developed among otters in captivity, the attendant need have no concern, if draftless dens are provided to prevent the possibility of their developing pneumonia. The laws of cleanliness must not be disregarded.

KILLING, SKINNING AND CURING

(See under respective captions)

THE SEA-OTTER

The Sea-Otter is an animal entirely different from the inland variety of which this article treats. Its habitat is confined principally to the vicinity of the frozen Pribyloff Islands; its range of distribution is so limited that the animal is not of sufficient numerical strength to make its pelt of interest to the fur trade in general.

In appearance and in general characteristics the sea-otter is a nearer approach to the seal than it is to the inland-otter; but probably a genus apart from either. It produces a very fine, valuable fur, which is surpassed in its class only by the seal itself.

Sea-otters live entirely in the ocean, subsisting mostly, if not wholly, on fishes and sea moss.

Inasmuch as this animal does not present a likely subject for domestic propagation, it shall not be dealt with further, in this volume.

THE MARTEN IN THE WILDS

The "Marten" as it is generally known in America, is called "Sable" in Europe, but it is frequently referred to in the United States and Canada as "American Sable." There are probably but two distinct species and geographic races of this animal; they are commonly



designated as "Pine Marten" and "Stone Marten." Either species produce extremely beautiful and highly valuable furs that stand in a class by themselves; the Pine Marten having the greater value because of the rich golden tint of the under fur blending so delicately into the dark, glossy, guard hairs of the upper parts; whereas, the throat and under parts of the Stone Marten are nearly a pure white.

Martens are native to the snowy highlands of the extreme north in both the American and European con-

tinents; frequently, however, in the mountainous regions of our northern tier of States may be found large numbers of them that produce furs of excellent quality—soft, thick, silky and beautiful when fully prime; yet, the finer marten furs come from Idaho, Montana, and the higher altitudes of the Canadian Northwest. I know of one marten having been killed as far south as central Indiana, or about the fortieth degree of latitude.

The Stone Marten is so called because of its characteristic habit of nesting among rocks, and in crevices of a rocky precipice. It is easily distinguished from the Pine Marten by the stone color of its under fur, and by the white tint of fur on its throat, and on the upper parts of its breast.

While the stone marten does not, habitually, seek the great heights among tall timbers, it can climb trees with remarkable celerity, and leap from limb to limb with charming grace.

The Pine Marten spends most of its time in the tall pines in mountain forests and among the loftier trees upon the mountain-sides. Some of our more experienced and observing marten trappers have discovered



The Stone-Marten seeks crevices in rocky cliffs.

that, where these animals are very numerous in a vicinity for a few seasons, they will desert it, concertedly, leaving the field barren, and the trappers at a loss to conceive reasons why the sudden departure. After a lapse of about nine years the animals will return to the same vicinity quite as unaccountably as they vacated it.



The Pine-Marten seeks the great heights among mountain timbers.

Their whereabouts during this nine years of absence is an inexplicable mystery to the bewildered trappers who lost their source of revenue through the exodus.

Inasmuch as nearly all wild animals know when they are being rigorously sought in any one field, it may be assumed with reasonable assurance that they desert the known district of their abode for homes in an unknown haven of safety. Martens leaving other localities for similar reasons do not

rehabitate districts recently deserted by other martens, because animal intuition warns them that the former occupants fled that particular field because it was unsafe.

The marten, when mature, is about eighteen inches long exclusive of its beautiful, bushy tail, which is about ten inches long; the fur of which is very much darker

than that of the body fur of the animal. They are so wonderfully agile in all of their activities that whether upon land or among topmost branches of a towering tree their every movement is accompanied with admirable grace. They traverse the trunks and limbs of trees so rapidly that squirrels cannot escape their spright. The Stone Marten, however, is not so distinctly arboreal in its habits, but it is equally active.

When angered, a marten will growl much as a coon would do; then it will attempt to attack its captor, and with a shrieking scream, spring so quickly that when trapped it will leap the entire length of the trap-chain, and seize its captor before he realizes that he is within the bounds of immediate danger from his captive. The marten "hangs on" with such bulldog tenacity that the trapper finds it extremely difficulty to free himself from the animal's fangs.

The general activity and characteristics of martens are quite similar to those of monkeys. They frequently comb each other's fur with their claws, picking out any ticks or vermin that might be infesting them. They also stand on their hind feet and "spar" as amateur boxers would do. To observe them in the performance of their extremely playful pranks is but to deepen ones admiration for their gracefulness.

Martens will dig considerably with their semi-retractile claws around places where timber-mice, moles, worms, beetles, etc., might be found, but they are not burrowing animals, and never burrow into the earth in the literal sense of the term.

Martens are so particular in keeping their furs dry that they never venture out of their dens when it is raining. They like to play in dry snow, and roll over

in it, but they will not go near it when it is melting, nor will they run on wet soil when they can avoid it.

THE MARTEN IN CAPTIVITY

RANCHING

Of this extremely valuable fur-bearing animal very little is known, as yet, relative to the real essentials for raising them successfully, but experiments now being conducted by competent persons will undoubtedly develop valuable information toward proving them to be about the most profitable to raise of any of the fur-bearing family. (See "Selling Price of Live Animals.")

A marten ranch may be established in almost any climate that is cold enough to produce furs. A rugged, non-productive hillside, or mountain top, would provide a natural environment, but these are not absolutely necessary if the location is in a reasonably high altitude for it is the nature of these animals to avoid humid areas such as would be encountered in the lowlands. The ranch should have a gray, sandy, or rocky soil that is well drained and will dry quickly, because these animals slink with repugnance from slush, and avoid water as does the house-cat.

Martens tame readily in captivity and, apparently, so appreciate an occasional visit from strangers that they will exert special activities in gamboling among the limbs of a tree in their enclosure. This evident welcome to visiting strangers is a trait distinctly apart from the nature of any other wild fur-bearing animal.

Unlike almost all other fur-bearing animals, martens never bathe; neither do they come out of their dens during wet, rainy weather, unless they are driven out by the

impelling pangs of hunger. While their range of distribution extends north to the Northern Line of Trees, even that frigid climate does not drive them into hibernation.

ENCLOSURES

Enclosures for martens may be as described under the caption of "General Fence and Pens Construction," excepting that the bottom turn-in may be merely a surface carpet, dispensing with the trenching. As martens are accustomed to extreme activity and are wonderful jumpers, they should be provided with pens as large as the existing conditions will permit, in which the trees or shrubbery should not be so near to the fence as to enable the animals to leap to the turn-in, and escape over the top of it.

The smallest enclosure to be considered for each marten or for a mother marten and her young, should be at least 12x12x12 feet higher. Each pen should be provided with an upright section of a tree trunk, with projecting prongs upon which the animals may exercise; with this arrangement the pens must be covered over completely because the animals could leap to the turn-in, from any part of the tree trunk.

The nest-box should be placed as high up as possible and where it will be in the shade, for these animals cannot withstand the hot rays of the summer sun, though they frequently indulge in a sun-bath for a few minutes at a time.

The covering for these pens should be about one and a half inch mesh galvanized wire, eighteen gauge. If a twenty gauge poultry wire is used for a top covering, it should be not greater than one inch mesh for additional

strength, because this cheap wire is so poorly woven that it is an easy matter for an animal to expand the meshes in their attempt to work their way through it. Covered pens are described and illustrated under the caption of "General Fence and Pens Construction."

Martens will run along the under-side of the top covering of these pens, in an inverted position, with nearly the same degree of grace and unconcern as if they were walking on the ground.

If martens are to be raised on a large scale, then a General Enclosure of three or four acres should surround the breeding pens. As soon as the young martens are weaned they should be liberated within this enclosure for superior development. The general arrangements within the enclosure may be as described for Raccoons, excepting that any small running spring within it may supplant the stream, because martens do not play around water.

NEST-BOXES

Nest-boxes for martens should be built in the manner of a box-within-a-box as described under the caption of "Animal Dens Construction." The inner box should be about 10x10x15 inches high, inside measurements, and placed inside of a box four or five inches larger at all sides and ends; this remaining space should be tightly packed with sawdust to assure lower thermal conductivity. This arrangement forms a wall four or five inches thick at all sides and ends of the nest. The entrance to the nest should be about 4x6 inches and should begin in one side of the outer box, at the top end of the inner box.

The boxes should be made to stand on ends, forming

a nest 10x10x15 inches deep, inside measurements; leaving nine inches of nest space below the lower edge of the entrance. An abundance of hay, dry leaves, etc. should be provided, with which they may make their own nests if they choose to do so, but they do not always make nests. All nest-boxes, whether in the breeding pens or out in the general enclosure, should be adjusted at the highest convenient elevations, because martens naturally prefer to nest at the highest possible point. However, the nests must be easily accessible to the attendant when he wishes to procure the animals for any purpose, which will often be necessary.

All knot holes, hollows, and natural cavities in which they may nest, in the general enclosures, must be plugged so the animals cannot occupy them to the inconvenience of the attendant; forcing them to occupy the dens that are provided for them.

FEEDING

Martens are carnivorous animals that live largely upon birds, squirrels, bird's eggs, rabbits, mice, bugs, beetles, moles, or any other small animals that they can capture within the vicinity of their general habitat.

The attendant to martens should be careful to feed them only fresh, untainted meat each evening in the proportion of about four ounces to each meal, and about one-fourth pint of fresh milk, with a small amount of cereal, wheat bread, stale corn bread, or animal biscuits in the morning. They will eat warm boiled potatoes, and also seem to enjoy warm cereals, especially when the weather is cold; and more so when these foods are slightly sweetened.

Martens will not eat meat that is tainted, nor will

they drink water that is not fresh, cold, and clear. When snow is available they always prefer to lap it up in preference to drinking water. They also eat tender vegetation of various kinds, either raw or cooked.

Martens should always be encouraged to take food from the hand of the attendant in order to intensify the feeling of friendship between the animal and its keeper, the ultimate result would, unquestionably, be productive of better breeders, more contented animals, and considerably more attentive mothers, all of which trend to further the success of the undertaking.

BREEDING

Each male, and each female breeder should be retained, indefinitely, in an individual enclosure unless the large family developing pens are used; in that case, not more than two females with their families should be kept in a pen. Breeders should be kept in the proportion of four or five females for each male. But each male must be kept separately at all times, except during the breeding routine when he must have the company of females. Adult males must never be associated with each other.

It is said by some authorities that martens breed only at night, making it difficult to determine when they have mated; inasmuch as they are not strictly nocturnal animals, this would seem unlikely unless the cover of night is resorted to through their fear of the attendant. It is also stated that female martens will lay straws, or small twigs crosswise, when the breeding season approaches, as if in attempt to make a nest, which is indicative of a receptive mood, and not until then is it safe to associate the sexes. The time when the sexes must be separated would be determined by their composure, or by the lack

of it, which an alert attendant will not fail to observe.

Throughout the most extensive research I have not been able to determine, positively, the exact breeding season for martens, but as all other members of the marten family breed during the latter part of February and in March, it would seem logical to conclude that martens would also breed about the same time; at least, it is in early spring that mother martens are always found with their young. Yet, information comes from a very reliable source that martens breed during the months of July and August, and that the period of gestation is about eight months, which would account for the young appearing with their mothers in the early spring months; or at the same time that the young of all other members of the marten family appear.

In view of this divided opinion on the time that nature has provided for mating, the attendant should carefully try out the breeding routine at both seasons mentioned, in their respective order of arrival. If he fails to accomplish the desired results during the first season, then he would feel reasonably sure of success during the next possible period.

An orderly procedure for breeding martens would be to admit only one female to the male at a time, so close watch can be kept over them. If she fights him severely they must be separated, and she be returned at a more opportune time. Transfer boxes may be used in carrying them to and fro. In case of the family developing pens, it is possible that the male may be admitted to the unit of males and remain there during the entire breeding season, if they seem to associate agreeably.

CARE OF THE YOUNG

Until the attendant's personal observations and experiences acquaint him with a fuller understanding of the actual requirements of young martens, he should leave them entirely to the mother's own care, and close observation on his part, in the meantime, should disclose many little details that would be materially helpful, especially during the breeding routine and while the young are undergoing the period of lactation. He should observe the mother at all times and try to determine the cause for every little unnatural movement she might make.

The young and the mother should both have the attendant's strict attention to the essentials to animal production, as described under the caption of "Developing Fur Animals."

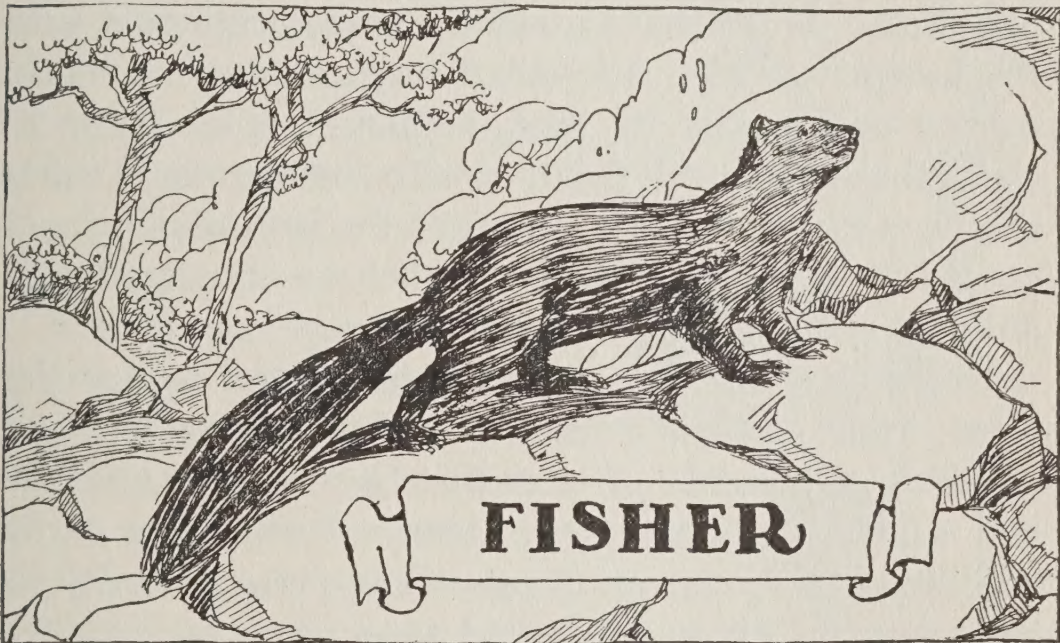
SKINNING AND CURING

(See under caption of Skinning and Curing.)

THE PEKAN IN THE WILDS

(Commonly called "Fisher")

So very little is known of this extremely valuable fur-bearing animal, in the captive state, that the essentials to its production cannot be vouched for in their entirety. So far as is known, they are direct members of the family to which minks and martens belong; then it would



seem reasonably safe to presume that the requisites for raising one would be applicable to the others, excepting for slightly varying conditions to conform to individual characteristics peculiar to the different species.

Irrespective of differences in physical construction, their habits, characteristics, and manner of living generally being so nearly identical that martens, fishers, and minks, may be safely accorded the same care and attention.

The name "Fisher" is a misnomer, which leads many

people to believe that these animals live by fishing along the streams and lakes which they frequent. While it is true that they will, possibly, eat fishes as almost all fur-animals do, fish is not a constituent part of their diet—neither do they enter the water in search of it. They are not aquatic animals, as the name would imply, nor are they more provided by nature for swimming than cats or squirrels. In fact, they are arboreal, rather than terrestrial animals.

Just how the Pekan acquired the name of “fisher” is unknown. It is believed that the name originated with the trappers, whose fish-baited traps were persistently robbed presumably by these animals. Some trappers claim that fishers will follow a trap-line for many miles during a night, rob every trap of the bait, and not get caught in any one of them. I believe this opinion is only the result of fabulous tradition.

Fishers are the largest, the fleetest, and by far the most vicious of their tribe. So swiftly do they traverse the limbs and trunks of trees that they capture martens and squirrels apparently without effort. Also birds alighting near them often pay the supreme penalty to the trappers, whose fish-baited traps were persistently robbed, presumably, by these animals. Some trappers claim that fishers will follow a trap-line for many miles during a night, rob every trap of the bait, and not get caught in any of them. I believe this opinion is only the result of fabulous tradition.

Fishers are occasionally found in the extreme northern parts of the United States, but they range, as a rule, within the immediate confines of deep forests in the low swampy lands of the Canadian wilds where they habitually nest in the hollows of large trees, usually

from forty to fifty feet above the earth, or as high as hollows are available.

They live upon birds, squirrels, birds' eggs, snakes, mice, wood-rats, frogs, bugs, beetles, rabbits, muskrats, or any other small animals that come within their path.

Mature male fishers weigh from twenty to twenty-five pounds, measuring about two feet in length exclusive of their long, bushy, beautiful tail. They are of a deep rich brown color over the back and sides, blending to a slightly lighter shade underneath. Their fur is particularly heavy directly over the hips.

The natural supply of fishers which once seemed plentiful in the wilds of the Canadian woods is now being trailed to the brink of extinction by skilled trappers who eagerly seek the tempting premium on their pelts.

When a fisher begins to sweep his long busy tail from side to side, he is ready to fight his tormentor, and he is a fierce fighter, hanging on to his victim with a death-like grip, never submitting for a moment. Compared with others of similar size, it is about the most power-



The fisher seeks the largest trees in swampy lowlands.

ful animal known. A trapper who is unfortunate enough to fall victim to its fangs must choke the animal into insensibility to regain freedom from its powerful jaws. They make little or no effort to escape an attacking dog, but instead, they will fight him on sight, and they usually win the fight.

Fishers are quite often found in some of our eastern zoological gardens where they seem to do well in complete captivity; their keepers find that they do not breed readily in close confinement, making it appear that a home production of these animals would not be feasible under the present known method of handling them. But, since it is well known that some of them do breed in captivity, it is reasonable to advance the opinion that with a better understanding of their characteristics and peculiarities, this detracting feature, which is the only hindrance to a home production of fishers, can be as completely overcome with them, as it has been with foxes.

Inasmuch as the actual essentials to a domestic production of these animals, are, as yet, fully futuristic, it would seem the part of wisdom to invest moderately in the attempt until a complete knowledge of their nature is acquired.

If this animal could be successfully raised on the ranch, it would be extremely profitable, because the pelts always command a high price, and the breeder could name his own figure for superior specimens sold for foundation stock. The only feature to overcome in the attempt to produce them domestically, is the lack of tendencies to breed, which would probably be a simple matter under the semi-control plan.

THE FISHER UNDER CONTROL

While almost any woodland district would probably do for a fisher farm, it is advisable to locate it in the lowlands if possible, or within the immediate vicinity of a marsh or swamp. Yet, if the animals are properly cared for, a highland location might not be a detracting feature, for some of the finest animals and furs have been raised on ranches under conditions and environments entirely foreign to their nature, all of which leads me to believe that successes depend entirely upon the care and food the animals receive, rather than upon adherence to natural conditions. Since fishers do not enter the water in search of their food, it may be that they frequent the lowlands merely because most of their food is found there, and not because of atmospherical conditions common to swamps.

ENCLOSURES

Enclosures for fishers must be strongly built. The smallest pen to be considered for a female fisher and her family would be about 12x12x12 feet high, with interior arrangements as explained for martens. Pens of this size must be covered over completely. If the General Enclosure system, or the Family Developing Pens are used, then the same general arrangements as described for martens would suffice. The wire for the fences should be not less than sixteen gauge and about one and a half, or two inch mesh. The closer mesh is suggested only for additional strength to the fence.

NEST-BOXES

Nest-boxes for fishers should be about 15x15x20 inches high, inside dimensions, with an entrance about six inches wide, by eight inches high. The general construction of the box may be exactly as described for martens, or under the caption of "Animal Dens Construction." It should be placed within the pen at a point as high up as possible. Fishers do not use bedding within the nest box, and will drag out any bedding that the attendant might place there.

FEEDING

The procedure for feeding fishers and caring for their young would be the same as described for martens, and minks. They refuse to drink water unless it is cold and clear, and not likely to drink it at all when snow is available, because, like nearly all fur-bearing animals, they prefer snow to water.

BREEDING

Fishers breed but once a year, supposedly about the first of April, bringing from three to five young at a litter. While it is reasonable to presume that one male is sufficient for five or six females during the breeding season, it is possible that they would have a tendency to pair-off, temporarily, and not breed while they are conscious of any one remaining in the vicinity, or within their sight. An observing attendant will soon determine, by their composure, or by the lack of it, when the time is propitious for the nuptial period. The general breeding routine would be as described for martens, or for minks.

CARE OF THE YOUNG

In caring for young fishers the attendant should be governed largely by the advice offered for the care of young martens, and minks, because fishers, martens, and minks, are of one and the same family, but minks are of the aquatic species. Caring for the prospective mother should be exactly as described for minks.

SKINNING AND CURING

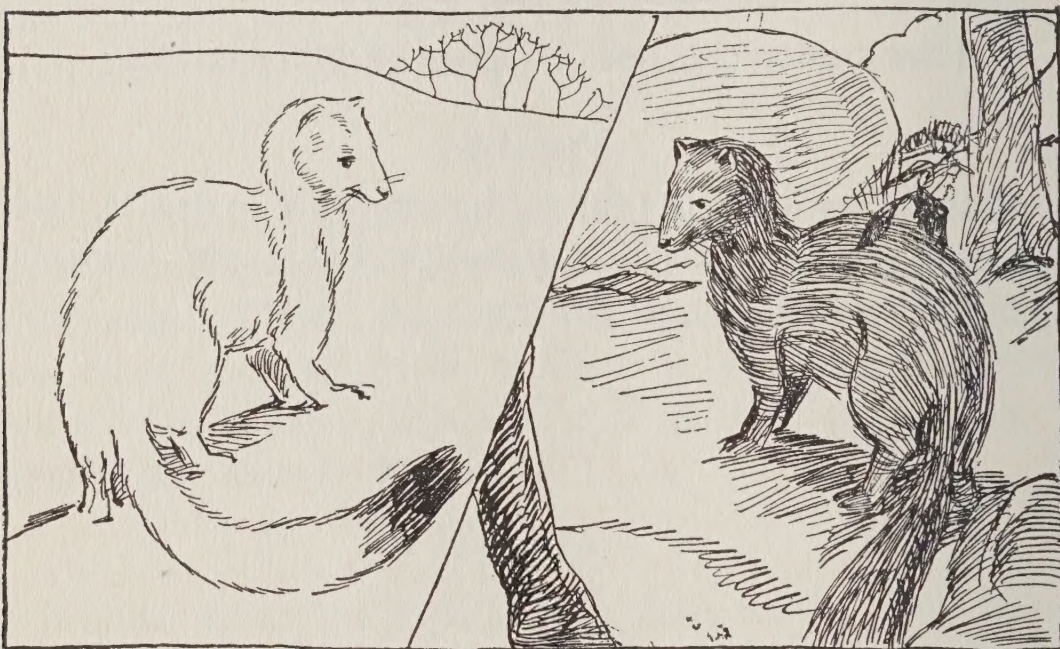
(See under caption of Skinning and Curing.)

DISEASES

Other than ailments caused by exposure to drafts, and unclean conditions, it is not believed that any diseases would develop among fishers.

THE ERMINE IN THE WILDS

The fur of this wonderfully beautiful little animal was so admired by King Edward III, during his reign, that it was decreed by him a punishable offence for anyone other than of royal birth to wear it. While this restriction has long since been removed, the ermine re-



Ermines in both winter and summer coats of fur.

mains the "royal fur," to which it probably owes its long standing popularity.

The ermine is a carnivorous mammal, the smallest member of the weasel family, confining its range of distribution almost entirely to the snowy regions of the frozen North in both Europe and America. However, it was my pleasure while trapping along the shores of Lake Huron, to capture one and retain it in captivity.

Ermines live on mice, mussels, birds, birds' eggs, bugs,

worms, beetles and crawfishes. Inasmuch as they are expert climbers, small and active, they can reach the nests of birds without much effort, yet, they are almost entirely of terrestrial habits, seldom climbing to any great height. They are fierce fighters, seemingly without fear of any animal, even of greater size.

With the exception of being much more diminutive, in general construction it is the counterpart of the mink. It has a heavy tuft of coal black hair at the tip end of the tail.

The metamorphosis of this little animal from its dull reddish brown color in summer, to a pure white at the advent of the season's first snow fall, without shedding its former coat, is indeed one of the wonders of nature. The tuft at the tip end of its tail, however, remains coal black at all times.

When the ermine is being chased, its pursuer can see only the black tuft of the tail against the snow; the enemy grabs it, but it slips through his claws, permitting the ermine to escape. Hawks and owls also try to pick up the little black tuft, only to have it slip through their talons, allowing the little animal to escape, that would otherwise have been meat for the bird.

Inasmuch as this animal is not extremely prolific—that it must be produced in great numbers to make it interesting from a financial standpoint—it would not seem advisable to make the expenditure necessary to propagate it successfully.

ENCLOSURES

Enclosures for raising ermines should be constructed exactly as for minks, except that the fencing should be of three-fourths-inch mesh wire to prevent very young

ermine from escaping through it, for, these little animals can get through a very small space. Their nature, habits, requirements, etc. are identical with those of minks.

FEEDING

Feeding and caring for ermine, generally, may be exactly as described for minks.

BREEDING

The general breeding routine for ermine may be as described for minks.

SKINNING AND CURING

Skinning and curing ermine is exactly as described under the caption of "Skinning and Curing" as applied to minks.

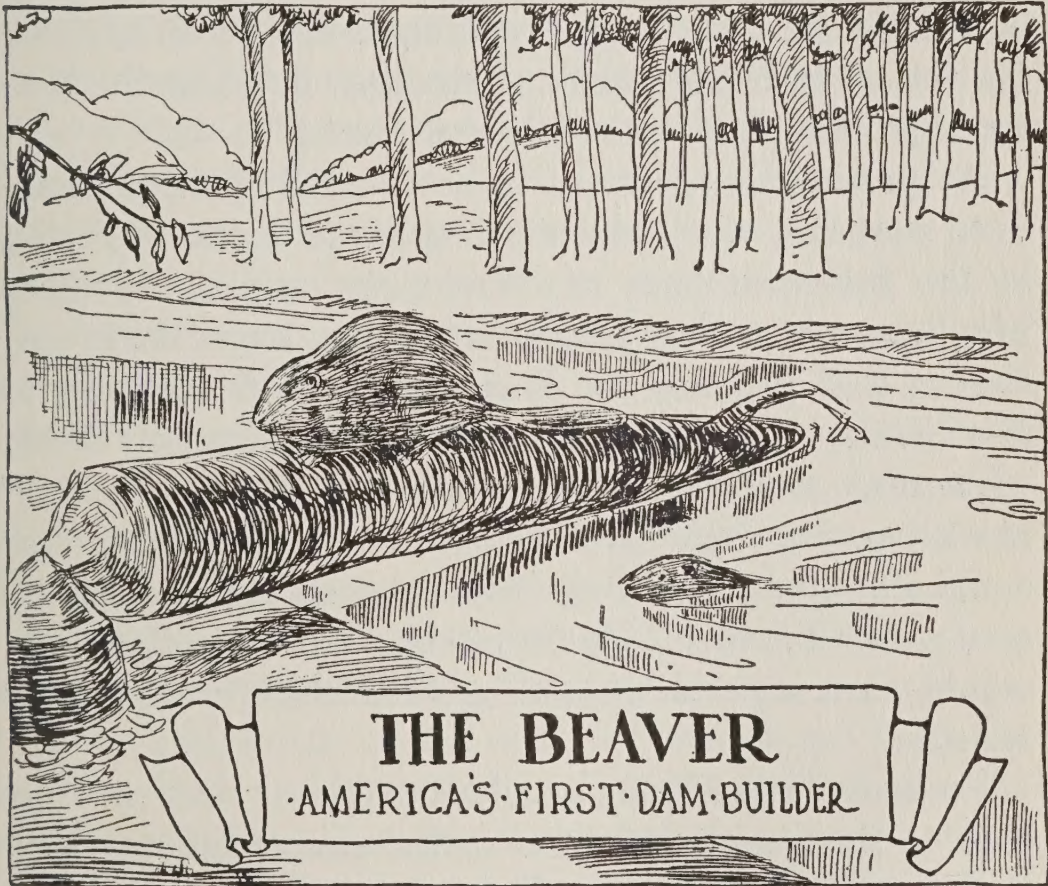
CARE OF THE YOUNG

Young ermine should be cared for the same as are young minks.

Ermine are but miniature members of the mink family.

THE BEAVER IN THE WILDS

The Beaver which was once the most important fur-bearing animal on the American continent, and probably in the world, has been so rigorously trapped off, that it is now nearly extinct; only about eighty thousand are trapped annually in the United States and Canada



combined. Localities in which they were once plentiful are now completely destitute of any sign of them. It is indeed to be regretted that such a wonderfully intelligent little creature should have been so mercilessly de-

stroyed, that its skin might contribute to our comfort and adornment.

Beavers were completely exterminated in the Adirondack Mountains of New York many years ago, and the district remained barren of all signs of them until recently, when a number of the animals were shipped in and released in the former beaver fields for restocking purposes. They are now so numerous in that vicinity that the farmers are uniting in their complaints to the state authorities of the damage the animals are doing by felling the forests, and building dams which back up the waters over the banks of streams, flooding the lowlands so that they cannot be cultivated.

At present, beavers are to be found in greater numbers, perhaps, along the south shore of Lake Superior, in the northern part of Wisconsin, and in northern Michigan where they present very fine, large, dark, specimens that produce the finest of furs. Sometimes, in this vicinity, beavers are found that are practically black, presenting excellent reasons to believe that a strain of black beavers could be developed. The ranchman who could develop a strain of black beavers could exact his own prices for them, for foundation stock to others who would want superior specimens with which to stock their ranches.

So many voluminous articles have been written, from time to time, with reference to the almost human intelligence with which these little animals are accredited, and many of these articles have been so enlarged upon, that their traits and peculiar customs shall be dealt with here only in part.

There are a great many articles in description of the strange nature and unaccountable habits of beavers that

tell us of the almost unbelievable things they do within the confines of their colonies in their forest environs, that seem as mythical as the stories of the "mermaid of the sea" yet, it is a fact that some of their strange traits are really as weird as are the fantastic stories describing them. The beaver is a herbivorous, aquatic mammal, from thirty-six to forty inches in length, and frequently weighs as much as sixty-five or seventy pounds when full grown. The animal's locomotion over land is so impeded by its clumsiness that its speed is scarcely more than that of the average man's walk; for this reason it never trusts itself farther than a few yards from water; its movements in water are not so swift as are those of the otter, but they are with corresponding easy and gracefulness—indicating that water is nature's own provisional for the animal's means of protection and travel. The beaver is not an amphibious animal, as some authorities claim for it.

The toes of a beaver's hind feet are connected by a broad cutaneous expansion that forms a complete web, like a duck's foot, and acting as a propeller from which the animal gets its power for speed in water. The second toe of each hind foot is provided with a double claw, one of which is small, thin, flat, and hooked over at the extreme end, much on the order of an orchard keeper's pruning knife; when not in use this little blade lies almost invisibly against the claw of the great-toe. This blade-like claw is used by the animals for dislodging splinters that become fastened between their teeth while they are cutting down trees. In this respect it serves them effectively as a tooth pick.

In the early days of America, the beaver was safeguarded by the Indians, who regarded it as "The Sacred

Animal"—to harm it was an omen of the visitation of evil upon their tribe. The belief among Indians that man evolved from the beaver, probably originated from the fact that beavers possess greater engineering or constructive ingenuity than did the Indians themselves at that time.



Beaver dam, and house in the background.

Beavers live entirely upon vegetation and tender bark of trees of various kinds, such as alder, birch, cottonwood, willow, poplar, and fir; in fact they eat nearly everything that grows in the garden, as well as aquatic plants of the various kinds. They do not eat fishes, as many believe.

In constructing their homes, and dams, they display wonderful feats of engineering for which they are known the world over. In this accomplishment they have no parallel in the animal kingdom—their little cousin, the muskrat being the nearest approach.

By damming the sluggish side of streams, they so regulate the depth of the water where they build their homes that they can come and go safely through the entrance, which is always below the freezing line. They sometimes change the entire course of a stream by running a dam directly across it, if the current is gentle; if the current is swift they construct a curved dam, the convex surface breaks the force of the water, thus relieving the pressure on the dam.

These dams are sometimes two or three hundred yards long, and from twelve to twenty feet thick at the base, rising five or six feet above water level. They are built with logs or poles which the beavers cut down by the use of their powerful incisor teeth. These cuts of logs which are sometimes eighteen inches in diameter, are usually from three to six feet or more in length. They are laid horizontally and held in position by means of rocks and mud which the beavers push tightly into the intermingling spaces with their powerful front feet, always working from the up-stream side so that the force of the current will assist in pushing the building material together. Information comes from several sources that beavers push stakes into the mud to assist them in building foundations upon which to construct their dams; but, throughout the many evenings spent in watching their course of procedure in this work, under the light of the moon, no evidence of pile-driving has developed.

They patrol the dams each night, and if a leak develops the entire colony responds immediately to repair it.

During various periods of close watchfulness kept over beavers where they were busily engaged in repairing and remodeling their old dams and dens, nothing has ever developed to support the general belief that they use their tails as a trowel, in this work. They use only the palms of their front feet to pack in and smooth off the mud mortar. A further observation of their habits reveals, without doubt, that they use the tail only in swimming and diving, when it serves as a powerful rudder in directing their course through the water, and especially to prevent swimming in circles when they are towing logs, for building material, to the place where construction is in progress.

When beavers suspect danger, at the approach of such enemies as men and dogs they will slap the surface of the water with their flat, trowel-like tails, as they dive, causing a loud, sharp report that may be heard on a cold still night for a distance of several hundred yards. That this is a signal intended to apprise all beavers within the immediate vicinity of approaching danger, is evidenced in that they all disappear, concertedly, upon hearing it.

Beavers' houses are sometimes from ten to fifteen feet in diameter, rising from four to eight feet above the water's level, with the entrance always from the underside of it and well down below the freezing point, so they can pass out, beneath the ice, during the winter months when the surface is frozen over. Several beavers, probably all of one family, will occupy a house together, presumably for the warmth that is supplied from the body heat of one another. Upon opening a number of these

houses to determine the interior den arrangement, sufficient evidence was found to support an opinion that these animals sleep separately upon small ledges tiered "bunk fashion" around the outer walls of the den leaving the interior entirely unused for sleeping accommodations.



America's first hod carrier.

Beavers practically desert their houses during summer months, but, immediately previous to the approach of cold weather they return to their old homes where many of them unite in the task of repairing them for re-occupancy during the winter months. Through their concerted activity on these repairs, the work is greatly expedited.

The space between the poles used in constructing their

dens and dams, is daubed with mud and gravel which is carried to the spot to be filled-in, by gathering it in their arms exactly as a person would gather up an armful of leaves, or chips. Then in an upright position they walk on their hind feet to the place to be daubed and throw the mud into the space, where they pack it tightly between the poles with their powerful front feet. They use their tail for a "prop" to prevent falling backward when they lose their balance while walking up the dam with the mud.

Some observers say that one beaver will pile mud upon the tail of another, to be hauled up, sled like, to the space to be filled-in; personally, I have never witnessed an incident of this kind.

In laying up food supplies for the winter, they cut down saplings which are usually from three to six inches in diameter, because these have the most tender bark. They then cut the tree into lengths of four to six feet and tow them through the water to the house where they store them at its base at the bottom of the stream for food during the winter; after the bark is eaten off these poles they use them for repairs on the houses and dams, over which they keep extremely close watch to prevent washouts.

When the desired trees have been felled too far back for the animals to trust themselves on land, they dig a canal leading from the stream up to the trees.

When the desired trees stand farther from shore than the animals care to trust themselves on land, they will dig a canal leading from the stream to the trees; then they fell them across the canal, cut them in lengths, and tow them to where they are to be used to suit their purposes.

An instance is known where a man kept a pet beaver in his house; the outside door to the room in which the animal was kept, had considerable space between it and the floor, admitting cold air. On a number of occasions when cold nights came, the beaver was given some old



"LOGGING"

Beavers towing logs through the canal, down the stream, and to the place of construction.

logs upon which to sleep, for warmth; on each occasion the animal tore a part of its bedding into shreds with which he stuffed the space beneath the door so completely that no cold air could enter the room. In this same manner they stuff mud and gravel mortar between the poles in constructing their dams and houses.

Beavers usually live in colonies. A strange male can not enter a neighboring colony without putting up a terrific fight against the town bully. In these battles they frequently injure each other seriously. If the new arrival is able to hold his own against the local bully, he immediately gains favorable recognition in the community. But if he displays any degree of physical inability or cowardice every bully in the bunch will puncture his pelt every time he crosses their path. If he is victorious over his first adversary, the former bully immediately loses the respect of the females with which he associated; all of which will pay exalted reverence to the new champion, in fond idolatry.

Beavers live mostly in colonies but they are to be found in scattering distribution throughout suitable areas that trapping has not depleted. It is not known whether they colonize because of gregarious tendencies, or because of the general topography of the surroundings and the food supply.

THE BEAVER IN CAPTIVITY

RANCHING

Numerous attempts are now being made at beaver ranching, especially in some of the Canadian provinces; the industry has probably reached its highest present development in Manitoba, and in Saskatchewan, where a number of persons have recently become interested in its possibilities; the experiment is still in its infancy and the requisite time for development is not yet, so that the ultimate result remains purely a matter of conjecture.

However, land that would naturally be more produc-

tive of beavers, would be less productive of anything else, except, perhaps, muskrats. With this condition confronting us it is obvious that whatsoever might be produced in beavers, would be clear gain; to this end, the attempt presents a promising outlook.

Because the development of the young is so comparatively slow; the natural increase so small; in spite of the high price their pelts will bring it would not seem sufficiently enticing to expend much capital in preapring to establish a beaver ranch, except in a wholly natural environment where the enclosure is practically all under water as in a shallow basin or lake.

Young beavers become tame almost immediately after being captured if they are not frightened by rough handling. They learn to nurse from a bottle very readily, making no attempt to bite when lifted by the tail.

The beaver fur is not prime until about the end of winter, or in the very early spring, but most fur buyers would grade them as No. 1 if they are taken any time after December 1.

ENCLOSURES AND DENS

Enclosures for beavers may be constructed as outlined in "General Fence and Pens Construction" or as described for muskrats, because these animals never dig into dry earth where there is no water in which to make the beginning. The fence should be of about sixteen gauge, two and one-half inch mesh wire, at least four feet high. Individual breeding pens for beavers would probably be unnecessary because these animals do not habitually destroy their young, or the young of others; yet the sectional units as described for muskrats would unquestionably be of great advantage in effective prop-

agation, because of the control it would afford the attendant over the animals. These colony pens should be about 15 feet wide by 50 feet long, and the canal should be at least 15 feet wide.

All beavers raised within an enclosure would probably live as one big happy family. If strange males are placed in their midst, however, they will fight them fiercely, frequently killing the newcomers, especially if males are in excessive proportion to the requisite number of females.

When beavers are placed within a newly enclosed ranch during the summer months, they build their own houses before the cold weather comes on if there is sufficient material available for them to do so. If they were placed within the pen during winter, dens of artificial construction must be provided in advance because the animals could not withstand the cold during the several days it would require for them to construct houses of their own.

The attendant should build these nest-boxes in the manner of a box-within-a-box, as described and illustrated under the caption of "Animal Dens Construction" except that the entrance to beavers' dens should be through a chute about twelve or fourteen inches square, inside measurements, leading out, into, and beneath the surface of the water from the center of the underside of the box. The mouth of the chute should extend two or three feet under water if possible, so it would not freeze up, to the exclusion of the animals, in going and coming under the ice; furthermore, beavers never make an exposed entrance to their dens, but in closely confined quarters they will readily occupy a den completely in the dry, with the entrance through an

opening in the side of it, similar to that of a dog-house.

The length of the chute entrance to the den is immaterial, if it is long enough to reach deep water, but the den itself must stand completely in the dry, and above the mark of possible inundation in the event of a freshet.

The dens should be about three feet wide, three feet long, and one and a half feet high, inside measurements, and built in the manner of a box-within-a-box, as described under the caption of "Animal Dens Construction." A sliding door with a rod attached to it should be arranged beneath the box so that the door may be pushed through a slit or opening in the chute directly at its intersection with the bottom of the box; by means of this arrangement it is possible to close the animals within the den so that they may be taken by the attendant whenever he wishes them. The door should be so arranged that it will not come entirely out of the slit through which it slides, because in that event it would leave an opening through which cold wind would enter the nest to the discomfort of the inmates, whereupon they would quickly daub it up with mud to exclude the air; then the attendant could not push the slide through the slit quickly enough to prevent the beavers from escaping to the water when they were disturbed by his efforts.

The cover for the nest-box should so fit over it that it would permit of some ventilation from under the eaves, but it must exclude both rain and melting snow. Beavers keep their dens clean by invariably depositing all refuse in the water, where it sinks and disintegrates within a very short time.

BREEDING

Beavers breed only once a year, usually around the first of April; the young are born four to five weeks later in litters ranging from two to six; about three would be a good average number. The young do not breed until they are nearly three years old. They are born with their eyes open and begin to swim when they are about one month old, but they remain with the mother until they are about two years old; so in the household there may be several youngsters of varying ages, which is a thing apart from the nature of any other fur-bearing animal. Their furs do not become fully prime until the animals are about three years old.

The sexes may remain together at all times in the proportion of one male to every four or five females; a greater proportion of males would prompt hostilities among them, when the defeated gentleman would become a "bachelor" and live the life of a hermit thereafter, refusing to participate in any constructional activities with the others.

While I have no precedent upon which to base my theory, I believe that the system explained for muskrats, under the caption of "Plan Number Two" in which four females and one male may remain together indefinitely, would be a very successful plan for beaver propagation. This system would make it necessary for the attendant to furnish all food for the breeding units, but when that is weighed with the many advantages that the system offers, it seems as if it would prove the more profitable regardless of the additional cost and labor attached to its construction and operation.

FEEDING

Beavers should be fed on vegetation of the kinds that their constitution requires. Certain trees, the bark of which they eat, should be hauled into the enclosure occasionally, because they are fond of gnawing on them. They will eat stale bread with milk, cereals with milk, and corn bread with milk. They eat aquatic vegetation of all kinds, and almost anything that grows in the garden. They like to be nibbling on something almost incessantly, but they do not eat much during warm weather, consequently they become very thin and present unsightly specimens during the summer.

MARKING BEAVERS

All beavers should be so marked, when they are young, that the sexes may be determined later, because it is almost impossible to distinguish between them when the animals become fully furred and the genital organs are completely hidden. The females are more easily distinguished because of their four teats. See "Marking Fur-Animals."

CARE OF THE YOUNG

Young beavers are very playful, harmless little animals that are usually well cared for by their mothers until they are weaned at about eight weeks old. When the mother begins feeding them vegetation preparatory to weaning them, she brings them green grass, water vegetation of all kinds, red clover, corn, oats, wild rice, alfalfa, etc. They also like oatmeal with milk, cornmeal mush with milk, and stale bread. In case necessity demands it, young beavers may be raised to maturity, or

to the weaning point, on a nursing bottle, with skimmed cow's milk, exactly as a baby is fed, and with the same frequency. In this event they soon cultivate a high



Luncheon.

regard for their keeper, and anxiously await his arrival with the bottle. He may lift them by the tail to his lap, where they sit upon their haunches and enjoy the contents of the bottle and coo as contented babies do, while they are nursing. They

will toddle around after the keeper in much the same manner of young puppies, showing a similar disposition to be awkwardly playful.

DISEASES

(None known that are fatal)

SKINNING AND CURING

Beavers should be skinned "open," as in skinning a cow. An orderly procedure is to begin by cutting the skin around the ankles of all four feet; then slit the skin of one hind leg down the outer edge to the tail and completely around it, continuing up the other hind leg to the place where the skin was first cut around the ankle.

Now slit the skin down the middle of the belly completely to the end of the chin, and slit the skin of the front legs in the same manner as the hind ones were slit, or where the skin was cut around the ankles. Proceed next to flay the skin back, as in skinning a cow. Care

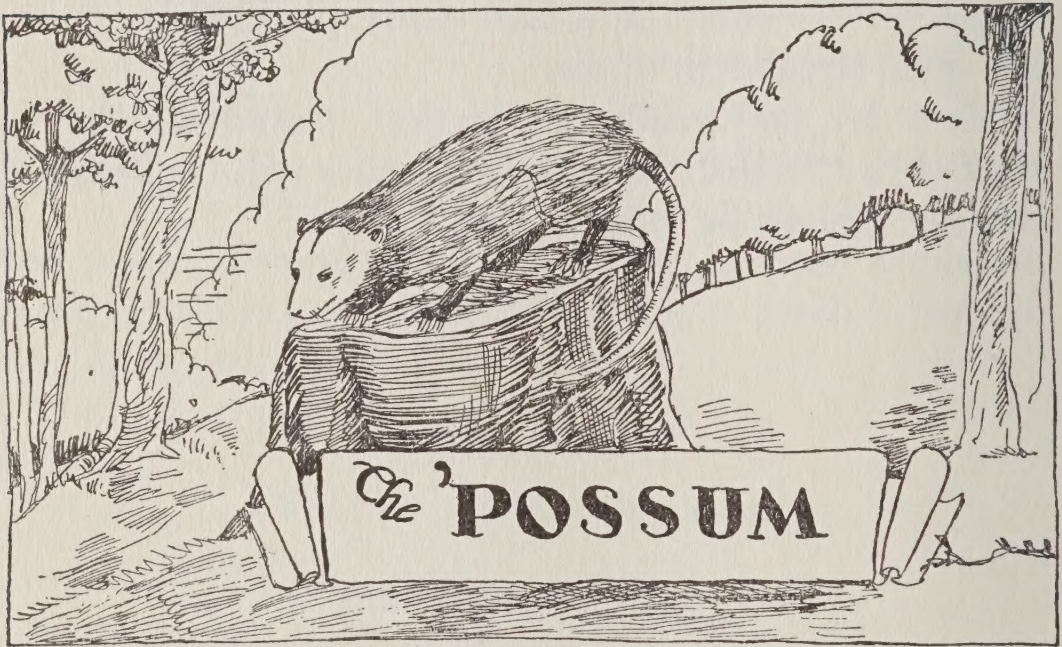
must be taken not to cut the pelt when skinning around the eyes, lips, etc. The ears should remain attached to the pelt, but the tail should not be detached from the carcass; it is worthless.

The skins are now ready to be tacked to the drying board, onto which they should be stretched merely enough to prevent wrinkling and shrinking while drying; then all adhering flesh must be scraped off. Beaver pelts should be stretched into an almost oval, or egg shape, and dried so, in a cool shady place where there is a good circulation of air.

They are now ready for market, and should be so packed or bundled that the fresh sides will not soil the furs by coming in contact with them.

THE OPOSSUM IN THE WILDS

Opossums are found in practically all parts of the United States probably in greater numbers east of the Mississippi and south of the Ohio Rivers. Not until recent years were they ever seen to any extent along our northern boundaries.



A few unimportant species of the opossum are found in Mexico and South America, but they are quite numerous in Australia where they produce superior furs which are frequently sold for Stone-Marten. The larger, darker and more valuable opossum furs to be found in the United States came from animals procured along the northern boundary of their North American range of distribution.

Opossums usually nest in hollow logs, stumps, and hollow trees. Each of their four feet serves them as a

“hand,” with which they climb slowly, but surely. They are poor runners; never leap; and are of arboreal habits; they move about very slowly in the trees lowering themselves from limb to limb with their four grasping feet assisted by the long prehensile tail with which nature has provided them.

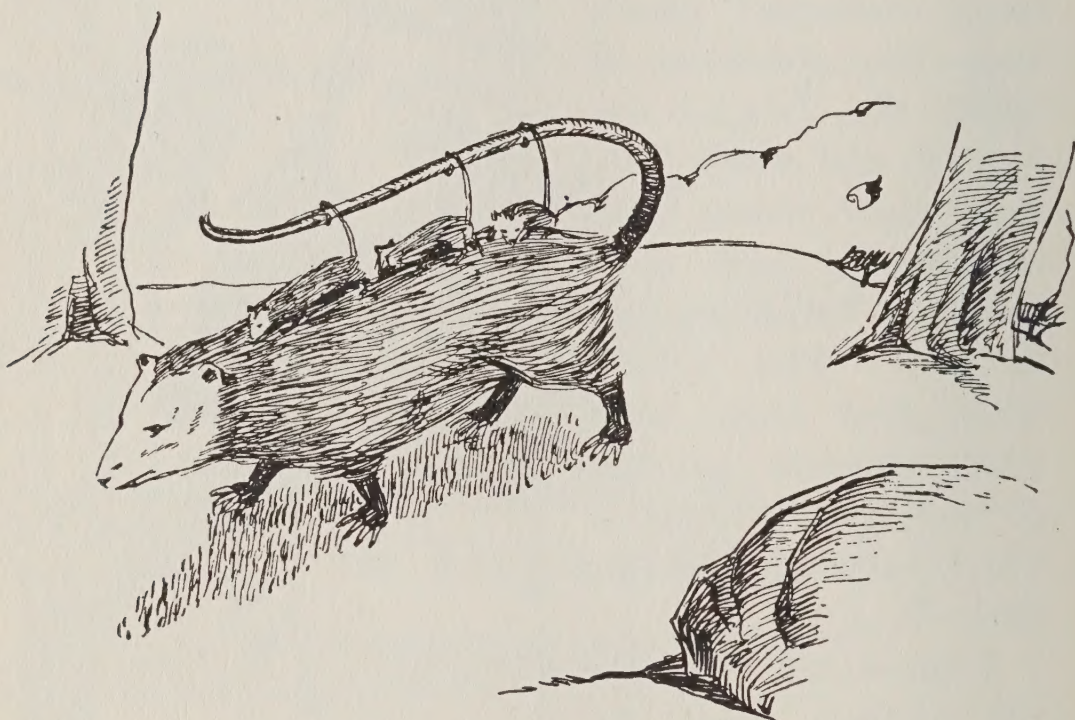
Female opossums of most varieties have a large marsupial pouch over the abdomen in which the teats are located, and where they carry their young from the time of birth until they are large enough to run. The young, when first born, are small delicate animals of imperfect formation, blind, hairless and helpless.

Immediately at birth, the mothers place the young inside of the marsupium where they at once attach themselves to the teats, and where they remain so attached, until nature completes their formation. When they are large enough to walk, at from seven to nine weeks of age, they come out of the pouch and ride on the mother's back, balancing themselves there by grasping her tail, which she arches over her back for their accommodation, and to which they cling by means of their own tails.



Assisted by his prehensile tail.

Opossums being slow-moving, languid animals, devoid of any effective means of defense, or escape from their enemies, they never trust themselves on the ground at any great distance from trees, to which they retreat immediately when danger is suspected. They are animals of almost purely nocturnal habits, seldom making their appearance during the day, unless driven out by



Out for a joy ride "on mother," speeding prohibited.

hunger in search of food; this occurs more frequent during late summer after the fruit and berries are gone, and all young animals and birds upon which they habitually prey have grown large enough to make their escape from the raids of the opossum. It is at this time of the year that mother opossums, especially, are extremely thin and emaciated, presenting pitiful specimens because of the recent task of nursing their summer litters, and it is then that they are so often seen

hunting food in daylight. Under normal conditions, they move about more during damp, rainy nights, than they do at any other time; when the fallen leaves do not rattle and betray their presence to enemies less active on such nights.

Opossums are by no means vicious animals, and do not put up a fight in effective defense when they are cornered, in fact they seldom make any attempt to combat their captors. At the first approach of man, however, they open their mouths widely, raise their lips and display their teeth, with a snarling bluff, as if preparing to make a fierce attack; instead, when they are touched or captured, it is peculiarly characteristic of these animals to feign death by allowing their bodies to fall limp, relaxing every muscle and remaining so during the entire time in which they suspect danger. From this little ruse, our antiquated proverb "playing 'possum" undoubtedly had its origin.

This animal is commonly known in America by the abbreviation 'possum. 'Possums hibernate in the Northern States during the colder winter months, but in their natural habitat, which is that of the Southern States, it is doubtful if they ever enter hibernation.

'Possum meat is very fat and greasy, much like that of the bear, but it is said to have a very delicious flavor; when baked with sweet potatoes it is reputed to be a rare delicacy for persons familiar with it.

THE OPOSSUM UNDER CONTROL RANCHING

The process of ranching 'possums is exactly the same as for raccoons, except that their enclosures need not be quite so large. These animals being not so terrestrial, nor so active, do not need so much runway.

While they sometimes dig out the loose dirt to make a nest under a log, in an embankment under some cliff or in a crevice, they are not burrowing animals. Very little expense need be incurred to prevent their digging out.

It is possible that 'possums may be raised profitably because of their enormous yearly increase. Their miscellaneous diet also permits a broad field in which to procure an economical food supply. The young grow so very fast that the period of maintenance is as inexpensive as it is short. A young 'possum, if well fed, will grow to weigh about fifteen pounds in seven months, or it will reach this weight about December first, following its birth; the fur is also fully prime by that time. Its flesh finds a ready market, especially in southern localities where there is a large negro population. It is highly esteemed by these people, as well as by many others, as a table delicacy, for which it brings a good price.

The pelts of 'possums do not bring high prices, but it should be borne in mind that the rancher has the advantage of finding a market for the flesh, as well as for the fur. With this in view, it seems as if 'possums could be raised profitably, especially when their rapid growth, and enormous production are measured with the low cost of maintenance.

It requires such great numbers of 'possum pelts to meet the ever increasing demand for their furs, that the rancher will always find a ready market waiting for them. The average price their pelts may be expected to bring, will be found under the caption of "The Selling Price of Raw Furs."

ENCLOSURES AND DENS

Ranch equipment for opossums may be exactly as described for coons, except that these animals must have an abundance of hay or dried grasses and rags for warm bedding, and their beds must be prepared for them, otherwise, they would freeze if the ranch is located in a cold climate. Opossums being southern animals they can not withstand the cold as can other members of the fur-bearing family. They seem to make little or no attempt to prepare for cold weather.

They will gnaw through a wooden enclosure or box den, if there is a crack through which they can see daylight to encourage them to make the start, otherwise, they probably would not gnaw, for as compared with other wild fur-bearing animals their natural impulse seems to be rather lacking.

Opossums do not appear to have the faculty that other animals have of foretelling the approach of extreme weather. If they are left unattended at the time of low temperatures, they would freeze. Therefore, the absolute necessity of providing for them, warm, dry, draftless dens, as illustrated and described under the caption of "Animal Dens Construction" with an abundance of bedding. They should not be compelled to use straw for bedding, for it is not warm.

FEEDING

'Possums should be fed all that they will eat once each day during summer, but they should be fed twice a day in the fall until they become very fat, because it is upon this accumulated fat that they live during periods of very cold weather when they do not come out to eat. They should not be tempted to come out by offering them food, for they should be comparatively thin at breeding time, which is immediately after the break-up of winter. All animals breed better when they are not so fat.

They will eat almost anything; persimmons, paw-paws, berries of all kinds, peaches, apples, pears, corn in the milky stage, onions, grapes, chickens, birds, mice, eggs, any kind of meat raw or cooked, cooked vegetable, bread, corn bread, corn meal mush with milk, corn bread with buttermilk, all kinds of table scraps, stale bread with gravy, or boiled cabbage. While tainted animal flesh, or garbage, will not repulse them, these should always be boiled before they are fed to the animals. During lactation the mothers should be given food of sufficient caloric value to enable them to promote the growth of their young properly. See "Caloric Food Values" on a subsequent page of this book.

BREEDING

The proper procedure for breeding 'possums would be exactly as described for breeding coons, except that one male may be associated with six or seven females about March 1, and remain with them until they are all mated. When a female begins to fight the male severely, it is sufficient evidence that she is mated; then she should

be removed immediately to her individual pen, or to the "Family Developing Pen," because if not separated at this time one would likely kill the other. As soon as the first litter is weaned the parent stock may be mated again, for they frequently bring two litters a year, ranging from six to fifteen young in each litter; nine would not be considered a high average number. Unless two mothers are retained in a "Family Developing Pen" each one must raise her family in an individual pen. Adult males must be retained separately at all times. They would kill the young 'possums if they could get to them.

CARE OF THE YOUNG

Young 'possums may be taken care of in exactly the same manner as described for young coons, or they may be left entirely to the mother's own care, if she is properly attended. Feeding would be the same as for coons, and as described under the caption of "Developing Young Animals."

All young 'possums of corresponding ages may run together until they reach maturity, but, unless separated, or pelted at this time, it is very likely that they would kill one another.

All young 'possums will bring young during the first spring season following their birth. It stunts the growth of the young to handle them.

SKINNING AND CURING

These animals should be skinned and cured "cased," that is, with the fur side in, and they should be so shipped because it is in this manner that almost all fur buyers wish to receive them. The following is an orderly procedure:

Begin by cutting the skin of each hind foot around the ankles. Then slit down the outer inside edge of one hind leg to the base of the tail and completely around it, then up the other leg to the place where the skin is cut around the ankle. Now proceed to strip the pelt down over the carcass "glove fashion," using the knife only in places where it is necessary to cut some ligament in order to free the skin from adhering flesh. Strip the skin down over the front legs in the same manner and cut it loose directly at the feet. When the ears are reached be extremely careful to skin around them and cut away as much as possible of the thick part of the cartilage at the base of the ears, leaving them attached to the pelt. Equally as much care should be taken in skinning around the eyes, lips, and mouth, so that all of the fur is removed from the animal's carcass without cutting or tearing it.

The pelts should now be adjusted to stretchers, over which they should be stretched only enough to prevent shrinking and wrinkling while they are drying. Now hang them in a cold, dry, shady place where there is a good circulation of air and let them remain there until well dried, when they are ready to be shipped. In shipping, be sure that they are so bundled that the flesh sides of the pelts cannot come in contact with the fur of others, and soil them.

Neither salt, alum, nor solutions of any kind should ever be used in curing pelts.

The tails of these animals should be left attached to the carcass; they are worthless.

The nose of the pelts should not be stretched because the elongated nose is suggestive of southern stock.

THE SKUNK IN THE WILDS

It has been and is now the common custom of the impulsive, "who act without thought," to kill all skunks on sight as they do snakes. So great has been the ruthless destruction of skunks in this way that many states, recognizing their real importance to the farmers, have been



prompted to enact stringent laws for the protection of these animals, except during winter weather when their pelts are prime and when insect life is inactive, for it is then that the pelts of these lowly animals, bring a tremendous revenue to the trappers of this country.

If farmers generally, could realize the real value of skunks in destroying bugs, worms, beetles, and meadow-mice on their farms, they would undoubtedly develop a far more friendly feeling for these animals and provide

dens to encourage them rather than wantonly destroy them, as is the common custom. But regardless of the farmer's declaration of friendship for skunks, and his armistice with them, both he and his family must pay homage to His Majesty when they meet him on evening parade, and respectfully grant him a reasonable part of the path at a distance in keeping with his dignity—for reasons well known to quite a number of us.

Unless skunks are raised on the ranch, or given better chances for an increased production by the enactment of more stringent laws to that end, they will soon be driven to the brink of extinction, as are others of the fur-bearing kind, because the eager trappers, prompted by the tempting premium on their pelts, are keenly on the alert to be first in the field when the trapping season opens, to enlarge their catch before others trap them off.

The geographic distribution of the North American Skunk is general from Mexico to the Hudson Bay, among which there are to be found several species and color-type varieties. Those inhabiting the Central and North Central parts of the United States, and north to Hudson Bay, produce the finer furs, in which the black is far more intense and much richer than those of more southern localities. It is this intensely black glossy effect that has so much to do with the value of their pelts.

As skunks are not very easily frightened by the approach of man, they are driven back by the advance of civilization more slowly than any other fur-bearing animals; in fact, they usually present very effective objections to being rushed. They are so nearly of a domestic nature that they are found upon farms and around cultivated fields more than anywhere else, often nesting in perfect contentment under coal sheds, granaries or

barns. Contrary to the first impression of persons who are not familiar with skunks, they are easier to raise and less trouble than almost any other fur-animals.

Skunks are purely terrestrial, seldom, if ever, climbing except to run up on an inclining log or to the top of a stump in search of bugs, beetles or wood-worms. They never jump, and unless the occasion is born of necessity, they burrow very little; they prefer to make their dens in the abandoned burrows of other animals, in crevices under rocks, in hollow logs, hollow stumps, under the corners of rail fences, under country school-houses or churches. They are also particularly fond of making their abodes under old straw or haystacks.

Skunks are provided with long, strongly built claws, but the extent to which they dig with them is seldom more than merely scratching out the loose dirt from under some object where they wish to make their nest. When they do dig down into the earth it is usually not more than a few inches beneath the surface, where they form a globular excavation for a den, which they line with dried grass, leaves or scraps of rags when they can get them.

Inasmuch as skunks are slow-moving, clumsy animals that can not escape their enemies in flight, nature has provided them with a very effective weapon of defense to which most Americans seek no introduction. This is an odorous fluid contained in two scent sacs, one of which is located on each side of the tail, slightly below its base, beneath the skin, where they are enveloped in muscles. Each sac is provided with a duct that leads to the surface, through which this nauseously scented fluid is ejected when the animal is on the defensive, by rigidly contracting the enveloping muscles, thus driving

the fluid through the ducts with great force in two small mist-like sprays, the odor of which will pervade the air for about one mile. If skunks are standing when they fire upon the enemy, they can throw these sprays for about fifteen feet, because in that position they are able to contract the enveloping muscles around the sacs more rigidly, thereby driving the fluid through the ducts with greater force than would be possible if they were running, when they could throw it not farther than six or eight feet. It is not thrown with the tail, as many suppose; in fact, they use great care to prevent it from touching their fur in any way. This scent fluid is generated in these sacs, by nature, only as a means of protection, and has no other organic function. It does not come from the kidneys, as many suppose, nor have they any connection with it whatsoever.

Unless skunks are running from an enemy in close pursuit, they will never throw the scent without first giving warning by stamping the ground with their front feet, by which they are able to produce a sharp, slapping report that is plainly audible for a considerable distance, especially when the ground is frozen. When this fluid gets into the eyes of the attacking enemy, either man or beast, it causes total blindness for about five or ten minutes, the skunks making their escape in the interim. When man regains his sight from this temporary blindness the vision is remarkably clear for a while, until it settles back to normal.

The lasting persistence of skunk odor after coming in contact with fabrics is remarkable; in fact, it can never be entirely removed from some materials. Perhaps the most effective means of removing it from fabrics is to wash them in a solution of one pint of formaldehyde to

one gallon of water; a thorough washing with gasoline will remove it from the hands and face. Another very effective method is to wash the garments in gasoline or benzine, then expose them to the action of the sun and wind for a while; they may also be buried in damp soil for about forty-eight hours. These recipes are not infallible, however, as the odor is not removable from some fabrics; it remains there indefinitely.

It is an erroneous opinion with many people that skunks throw their scent, promiscuously, at the approach of man; they use it only as a last resort, in self-defense. When skunks are found in the open, they may be approached slowly, and cautiously, until they are cornered, when they may be lifted by the tail to a sack, or a box, without fear of their scenting if no quick movements are made to frighten them. The ranch raised skunks may be so handled with impunity. On several occasions I, personally, have hauled a number of wild, newly captured adult skunks for a distance of twelve to fifteen miles in the tonneau of an automobile without their making any attempt to throw the scent.

On one occasion when quite a number of wild skunks were shipped to the ranch by express, from afar, not a scent was thrown while they were in transit, but after they reached the destination and were roughly jammed into a corner of the freight house, the express man hurriedly 'phoned us to have them removed because they had played an unreasonable trick on him. But, he honestly admitted that the careless act of the skunks was but one of rightful retaliation for the rough handling to which he had subjected them. When I reached the freight house, no detailed explanation of the exact nature of the trick that was played was necessary. In fact,

I got wind of the real truth long before I reached the scene of the odoriferous incident.

It is popularly believed by many trappers, as well as by some ranchmen, that skunks cannot throw their scent while they are being lifted by the tail; since I have had several experiences in lifting them too inconsiderately I wish to emphatically advise differently; however, if they are handled gently it is not likely that they will be so rude, except when in the immediate presence of dogs, or if frightened by quick, rough handling.

Skunks may be crated and shipped by express without fear of their scenting, unless the crate is pitched or thrown or allowed to fall from the trucks. However, if the express companies know it they will not accept the animals for shipment unless they have been deodorized.

In northern latitudes skunks enter a state of semi-hibernation during the colder periods of winter, sometimes not coming out for food more than once in ten to twenty days. Frequently all members of a family of the preceding summer, and perhaps others, will occupy the same den during winter, for warmth, until mating time in early spring, when they will separate and seek individual quarters. Some authorities say that as the spring approaches they mate up, or pair off for the season. But, every characteristic peculiar to this animal's nature lends sufficient evidence to completely disprove this theory, and to establish the fact that they are purely polygamous animals.

Wild adult skunks are of nocturnal habits, but, the ranch raised ones frequently appear in broad daylight, making little or no effort to seclude themselves from persons near them. It is the common custom of skunks to emerge from their dens about dusk each day in search

of bugs, worms, beetles, etc., which are easily captured at this particular hour because it is then that practically all insect life is on the move.

After it becomes darker the animals dig the insects from old decayed logs or stumps or from the earth, leaving many little cone-shaped excavations from which the bugs and worms were extracted.

It is the popular opinion among farmers and among others less conversant with farm life, that skunks prey chiefly upon chickens. Of course they do eat chickens occasionally, but in nearly every instance where a disturbance has been created in the poultry yard, a close examination will disclose the guilty one to be a weasel or possibly a mink.

The following information on characteristics peculiar to the different animals may assist in solving the mystery and indentifying the real culprit: Minks eat only the brains; weasels drink the blood. But either will kill every hen it can reach. A skunk will eat the flesh, confining itself to one victim until its appetite is satisfied; then it will retire leisurely to its den and indulge in peaceful slumber.

Skunks do not climb and can not reach the hen-roost. Minks and weasels are both expert climbers; either will kill several chickens within a few minutes; the weasel will drink the blood of one hen as long as it flows freely, then attack others until the thirst is satisfied. A mink will eat the brains of one victim; then it will immediately kill every hen in the house with lightning rapidity, making no attempt to eat any part of them.

It is reported from one skunk ranch that spring chickens of the frying size have eaten daily with skunks, at the same time and from the same feed-pans, and were

never harmed. I do not deny that skunks eat chickens, but accrued evidence is sufficient to support the belief that they eat poultry only in the absence of more choice rations. Like all other animals, when driven by extreme hunger they are actuated by the law of least resistance to eat the first thing that presents itself, sometimes cultivating a taste for food that would ordinarily be undesirable. This is one of the laws of nature, to which man himself is no exception.

Although in the absence of witnesses, the skunk is generally accused of nightly raids upon the hen-roost, it has a good alibi in the report of the Biological Survey, U. S. Government, to the effect that, "upon analysis of the stomachs of sixty skunks, taken in every month of the year, one of them contained bird feather, one chicken, one berries and fruit. The others contained bugs, beetles, mice, rats, etc." Yet, despite these facts which so completely vindicate the skunk of the many poultry-pen murders with which he is charged, it is extremely difficult to remove the time-worn prejudice against him.

The little striped polecat (or civit) which is more prevalent in the southern sections of America, is a much smaller, quicker, and more active animal than the skunk, and much more destructive to poultry because of its ability to reach the average hen-roost with comparative ease. It is the general belief that these two animals are identical, but the truth of the matter is that they bear a likeness to one another only in the effectiveness of their never-to-be-forgotten scents.

Inasmuch as they are armed with the same weapon of defense, some writers refer to polecats as "the lesser skunk," irrespective of their physical differences. The

pelt of the common polecat is of very little value to the fur markets because of its mottled design, which carries with it more hair than fur.

When skunks find a bumblebees' burrow, they frequently lay in wait at its brink, killing the insects instantly by snapping them in the head as they attempt to come out, and then devouring them. When bees that are out, alight to enter, the skunk quickly kills them with its sharp claws, which are long enough to prevent the sting from reaching the foot. After a few visits to the burrow the skunk will have devoured the entire swarm.

The fur of the skunk is so long and dense that in the event an exasperated bumblebee or a wasp becomes entangled in it, the insect's sting would scarcely reach the skin; however, the animal quickly removes the insect with an admirable degree of skill by employing his long claws in the manner of a comb.

Because skunks are so often seen around the carcass of a dead horse, cow, hog, or other animal, it is popularly believed that they are there for the purpose of eating the putrid flesh; whereas, they are really attracted there by the presence of bugs, beetles, and the many worms that are always found in large numbers around carcasses, especially in summer.

In further evidence of the worth of skunks on a farm, it is clearly perceptible to the more observing tenants that when the skunks are closely trapped from the fields, meadow mice and obnoxious insects multiply rapidly. While house-cats are beneficial in destroying mice and rats in a barn or granary, such service as the skunk will render is far superior. It is more satisfactory than a cat for ridding a storeroom basement of rodents because when the skunk catches a mouse or rat, he completely

devours it, leaving nothing to create odor. After he becomes accustomed to a basement, a skunk will run about the room apparently without fear, never attempting to throw the scent unless cornered by a dog or suddenly attacked, when he would probably not be so considerate as might be desired, and become a bit careless in his demeanor in the presence of company.



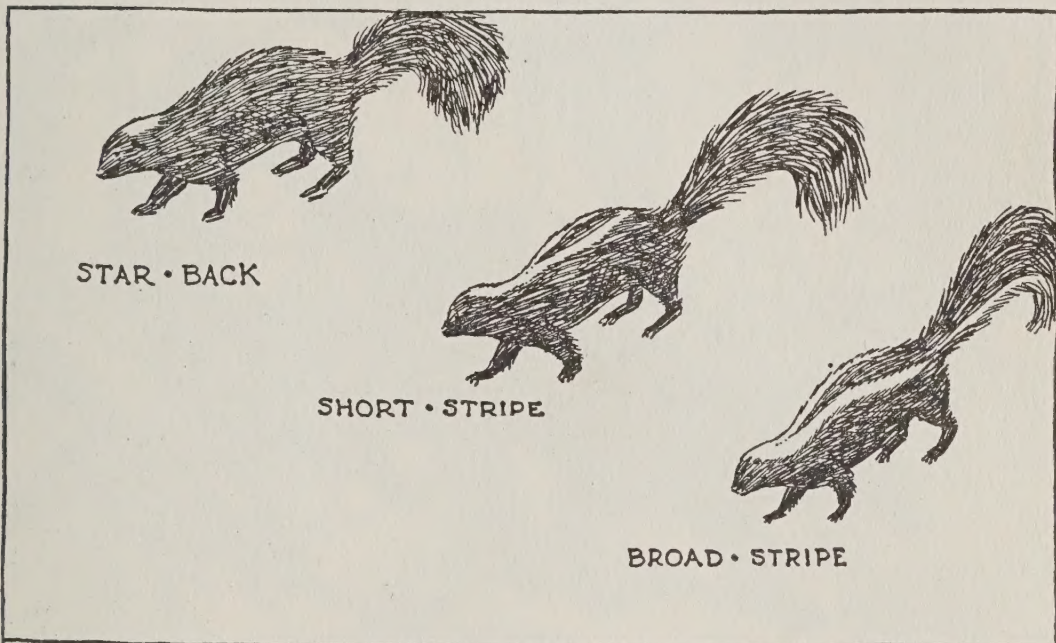
Split Cap, the most valuable type of skunks.

Skunks are wonderfully quick in springing upon their prey, or in swinging the body for that which may be within their reach on either side. In running from their enemies, they are clumsy, slow-moving animals, depending upon the effectiveness of their scent rather than speed for their escape. The belief of many that the skunk's bite produces hydrophobia is entirely without foundation; I have been bitten repeatedly, as probably have all others who have raised them.

While some skunks are solid black, with the excep-

tion of a small white "V" on their crown, others are of most beautiful markings; the pure white stripes through the otherwise intense blackness of the fur produce a wonderful contrast which is enhanced when the fur is prime, by the glossy effect of the guard hairs of the black portions.

Were it not for the lack of agility so detractively fea-



Skunks showing the most white, have the lesser market value, yet they are the most beautiful.

tured in their clumsiness, skunks would, indeed, be classed among the most beautiful of North American animals. Yet, strange to say, the most beautifully marked skunks are of the least intrinsic value. The solid black ones, at all times, command the greater price for their pelts.

Many persons believe that the white and black parts on a skunk pelt are merely white and black fur. The white stripes are hair—*not fur*. In manufacturing furs, the white stripes are cut out of the pelts and used prin-

cipally for making brushes because they will not take the dye and cannot be colored to correspond with the black parts.

When young skunks first begin to take food other than the mothers' milk, she will take them out and teach them to hunt food preparatory to weaning them. They are inclined to be playful at this age, running around



A proud mother and her children on evening promenade—"BEWARE" ye sauntering lovers.

her, tugging at her, rearing up on their front feet seemingly in an effort to balance themselves by waving their broad bushy tails in the air, as if for a balancing pole.

As the season advances skunks become less playful; when they begin taking on fat in the fall preparatory to the approach of winter weather they become more in-

active; by the time cold weather sets in they are purely "matter of fact," indulging only in activities necessary to procure their food, showing no disposition whatever to be playful, *nor to be played with*— ???

Contrary to the general belief, skunks seldom wander to any great distance from their dens, except when they are driven by hunger to do so.



Young acrobats of odoriferous reputation.

THE SKUNK UNDER CONTROL

RANCHING

Skunk ranching has been carried on in the United States and Canada for a number of years, mostly in an experimental way. In spite of the fact that many have met with the most gratifying results in these experiments, none have attempted it purely as a commercial enterprise. While some promotion schemes have fallen through, (as originally intended) those who have de-

voted their interests to raising skunks have, on the whole, met with results far beyond their expectations—much to the chagrin of their jeering neighbors.

However, failures can be met with in the skunk raising business just as in anything else. Yet, where proper energy and earnest effort are employed there are very few enterprises that offer as much on the investment as skunk or fur raising. Management is the decisive factor.

The following article is an extract from *Farmers' Bulletin 587, U. S. Department of Agriculture, Washington, D. C.*:

“As a source of fur, skunks are an important asset to the country. They bring to the trappers of the United States about \$3,000,000.00 annually.

“The propagation of skunks for their fur promises to develop into an important industry. It is at least a matter of sufficient importance to warrant the most careful investigation. Experiments in breeding the animals should be generally encouraged.

“While some breeders have encountered difficulties, others have been quite successful. On the whole, there are excellent reasons for believing that a profitable industry may be developed. Skunks are less wild than most of the musteline family; their miscellaneous diet permits a good deal of latitude in feeding.”

A skunk ranch should be located in a high, dry, well drained place, for these animals do not thrive in damp, marshy lowlands nor in dense forests.

If the ranch is located in a vicinity where there are wild skunks, it will be observed that at breeding time many of the wild animals will be attracted to the ranch from long distances, and will make strenuous efforts to

scratch their way into the enclosure to avail themselves of the company of the inmates.

If the attendant will prepare a number of box-traps, and place them alongside the main fence he will be able to catch many wild skunks while the breeding season is on. As soon as the season is over the traps may be removed for it is unlikely that wild skunks will come there again.

This should enable an alert attendant to secure a tremendous herd of breeding stock at little cost, merely that of constructing the traps.

Since "an ounce of prevention is worth a pound of cure," it would be wise to retain all newly caught skunks in separate quarantine for at least ten days for observation, to determine if they are suitable specimens, physically, to enter the herd. See "Quarantine Station."

Deodorizing adult skunks is difficult, as well as being accompanied with considerable danger to their lives, therefore, it is not advised. The newly captured females may be bred and retained with their young until winter, when the old ones that are not deodorized may be pelted. This gives an attendant the advantage of securing their spring litters, all of which may be deodorized if he wishes to produce a scentless herd.

Skunks are naturally very fat at skinning time; this fat has a good marketable value when rendered into oil,—usually around \$1.25 to \$1.50 a gallon. It is sold to manufacturing chemists who use it for medicinal purposes.

The scent fluid also has a value,—usually from \$2.00 to \$3.00 for a dozen sacs. It is sold to manufacturers

of animal bait which is used largely by professional trappers. It also has medicinal properties, for which much of it is sold.

The tail hairs of skunks, as well as the white hairs of their pelts, are used for manufacturing brushes; but these are sold with the pelt intact.

The pelt value of skunks is good; the decreasing supply probably never will permit of their falling to a lower level than that of present day values. The additional revenue derived from the sale of breeders, together with the revenue from the by-product, or those that are pelted, should suffice to meet the lucrative demands of any one to whom an outdoor life appeals, where there is freedom from the daily routine measured by the clock of a commercial industry.

BACKYARD PRODUCTION

To persons physically incapacitated, and to any others having limited space in which to operate, this plan of back-yard production is offered as a source of sustenance and as a subsidiary to the fixed vocations of those living in large cities or in smaller towns, where water and sewer facilities are available. This little sideline to the family income would require only about an hour of one person's time each morning and evening, and would not interfere with the daily routine commonly incidental to commercial or trade obligations.

Those who wish to operate on a larger basis are directed to one of the plans set forth in the pages that follow, which would require at least a suburban location beyond the jurisdiction of city ordinances.

For a production within the city, where water and sewer connections are available, this plan is advised.

The exact size for a skunk yard is entirely dependent upon the number of breeders to be maintained or upon the space to be utilized.

As one male skunk is sufficient for about eight females it would seem that this unit of nine animals would be the least number with which to start, especially if a quick production is desired; however, a start may be made with *one bred female*; then sell off the males of her litter to purchase another from unrelated stock; this procedure would prevent inbreeding and transfuse new blood into the herd.

If it is intended to make the start with the proportionate unit of nine breeders, it will be necessary to build nine individual pens, because every adult male must be retained separately.

Every female should have an individual enclosure, from the time her young are expected until they are weaned. All young, regardless of sex, may run together with their mother until midwinter; if properly fed they do not become antagonistic before that time.

The pens should be made of one-inch mesh, sixteen or eighteen gauge, galvanized wire. They should be about three by nine feet, and about three feet high, with a wire, board, or tin turn-in at the top about eight inches wide; when the animals climb the fence they will encounter this barrier and be forced to turn back. The turn-in should slant slightly for drainage, and to prevent heavy snows from breaking it down.

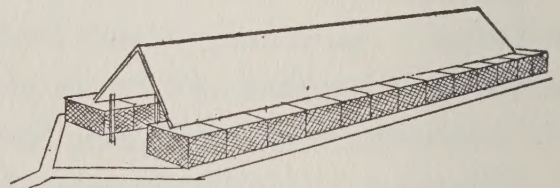
The pens should be built on a platform, in two rows, with an aisleway of about three feet between them; then, if the pens are to be nine feet long and the aisleway three feet wide the space consumed would be twenty-one feet wide, and as long as is necessary to accommodate the

number of pens needed. For the sake of economy, the aisleway need not be floored.

Each platform should have a "V" shaped trough at the outer edge running its entire length, with water gates at the lower corners through which drainage or sewage may pass, so that when the pen floors are washed all refuse will be carried away by the troughs that intersect at the lower end and lead to the sewer. Then the troughs may be refilled with fresh drinking and bathing water.

A shed, as shown in the accompanying illustration, should cover nearly one-half of the length of the pens, with eaves coming to within four or five feet of the ground or to the top of the fence. This provides shade in the summer, a dry runway in the winter, as well as enabling the attendant to do his work comfortably in inclement weather. The nests should be in the ends nearest the aisleway.

Inasmuch as all refuse accumulates at night, the floors of the pens should be washed in the morning to keep the



The City Skunk Yard.

place in an absolutely sanitary condition. The floors are easily washed by attaching a hose to a hydrant operating from the aisleway, washing all refuse outward to the troughs, which carry it to the sewer.

If the platform is built to slant slightly toward the troughs from each side of the aisle, it will be easier to wash and will afford better drainage in general.

The nest-boxes should stand on legs four or five inches high, so that the platform beneath them can be washed; this arrangement also permits better drainage and general cleanliness.

All other essentials to skunk-raising in the back yard should be exactly as described, in general, in the article on skunks.

This plan for a city skunk-yard applies merely to conditions in which the essentials are explicit. The actual construction may be in conformation to individual surroundings and advantages as, in the absence of a hydrant and sewer connections, a pump and dry well would suffice.

The yearly production and income to be reasonably expected from the number of breeders maintained, may be determined by reference to the Table of Animal Increase, Selling Price of Raw Furs, and Selling Price of the Live Animals.

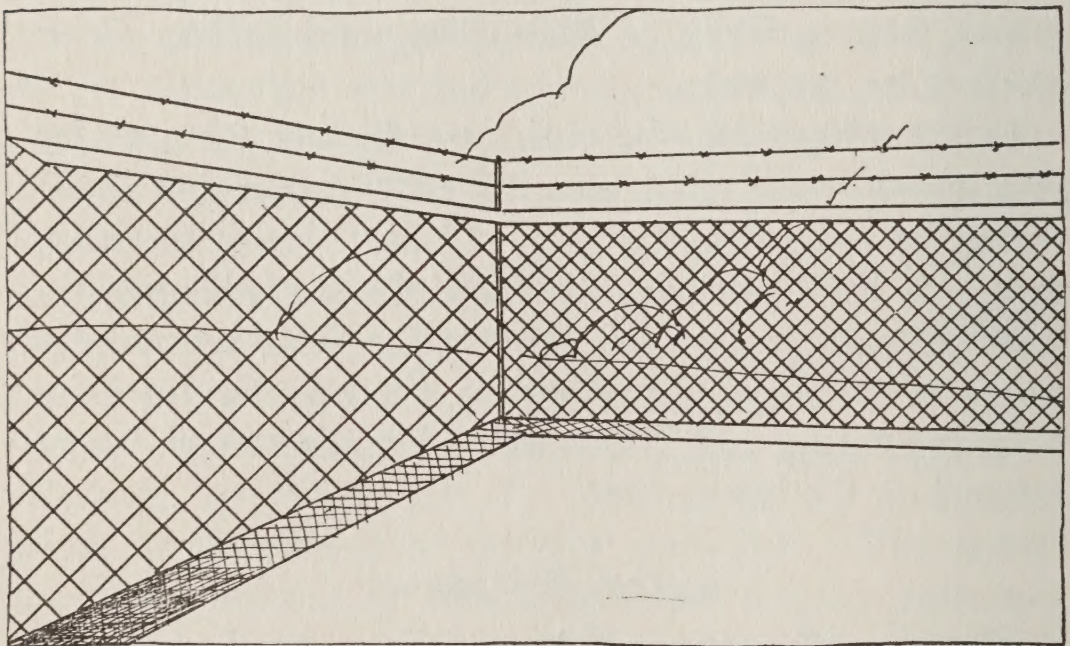
In all probability the entire production from a city skunkyard would find a ready market (as breeders) within its immediate vicinity. If not, then a small insertion in the advertising columns of one of the publications devoted to outdoor enterprises should promptly consume the surplus, eliminating the necessity of skinning and curing and, incidentally, bringing much larger returns on the investment.

GENERAL ENCLOSURES

The size of enclosures in which to develop skunks during the period of adolescence is purely dependent upon the number of breeders to be maintained, the annual production desired, or upon financial circumstances. To make requirements more explicit a ranch of three acres is described. Of course, a ranch of greater or lesser proportions may be constructed according to the production desired.

A trench about two feet wide and three feet deep,

or to hard earth, should be dug around a tract of three acres. The trench should be carpeted with a layer of sixteen gauge, one and one-half inch mesh galvanized wire, twenty-four inches wide. The wire that is to form the fence should be of the same material, about six feet wide. It should be placed against the outside wall of the trench, thoroughly intersecting with the layer-wire at the bottom. Then the trench must be refilled, forming a fence three to four feet high, extending two or three feet underground, with a twenty-four inch "turn-in" at the bottom.



General skunk fence construction showing top and bottom turn-in, and barbed wire protector.

The fence should have another "turn-in" at the top, as described in the foregoing, so that when the animals climb the fence they cannot escape over the top. Also a few strands of barbed wire should mount the fence to prevent dogs from entering the skunk-yard.

If the bottom of the ditch is laid with rocks instead of

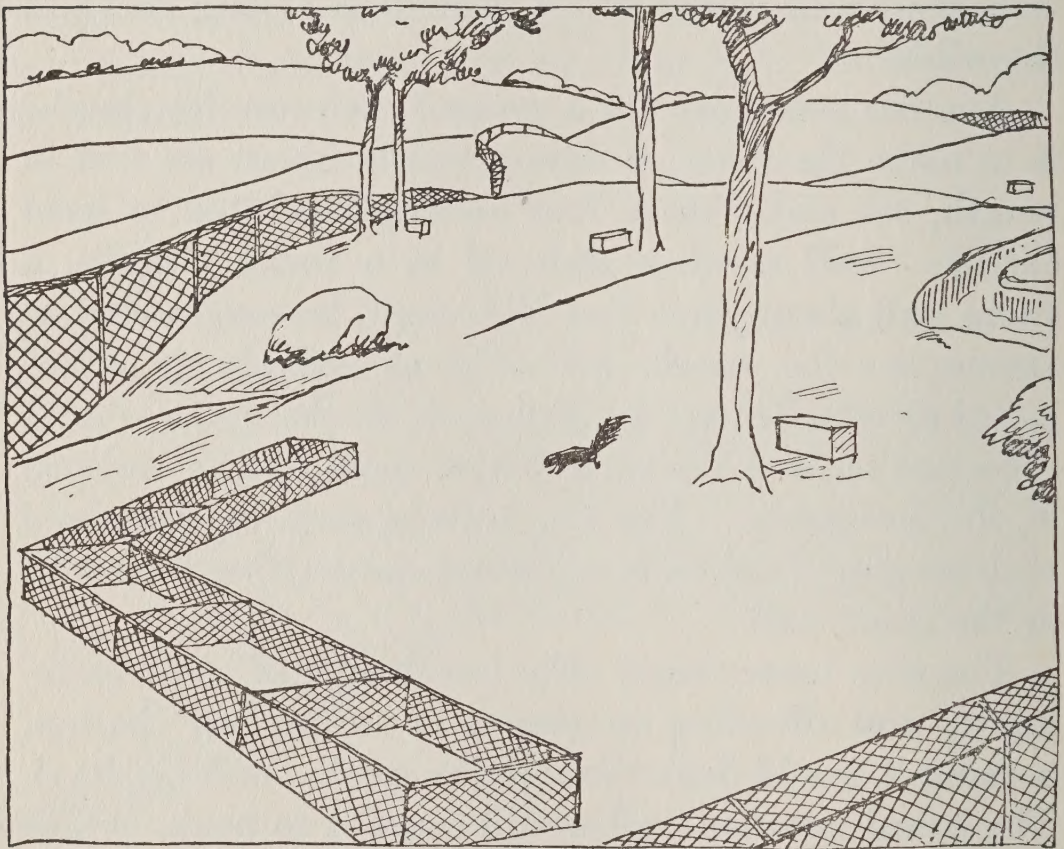
wire, the size of each rock should be not less than that of a skunk's body, so they can not roll it out through the burrow in the event they dig down and loosen it. The foresight of nature in anticipating the future needs of every living creature, provided skunks with strength in their feet which when compared with the size of the animal is almost beyond the conception of man. This muscular strength enables them to meet with many emergencies in constructing their dens among rocks in the wilds.

Another good plan for a general enclosure for skunks is to make the fence of strong boards about six feet in length, set about three feet underground (or to hard earth). Still another plan—if in a rocky vicinity, a stone wall about three feet high could be constructed to encompass the ranch, probably as cheaply as either board or wire fence. In either event, the underground construction and the barbed-wire should be as outlined in the foregoing. The top turn-in may be dispensed with because the skunks could not climb either the board or the stone wall.

The wire fence would offer less danger of snow banking up and affording an avenue of escape over the top, because it would drift through the meshes and lay level. The board or stone wall would cause it to bank, yet, as skunks seldom if ever walk into snow banks of their own volition, little is to be feared from that source. They keep themselves as dry as possible at all times during cold weather.

Since skunks are not climbing animals, very little preparation need be made against that contingency. They can climb mesh-wire fences with ease, the meshes furnishing footholds which enable them to do so. They

are not persistent in their efforts to climb out, and whenever they encounter resistance the attempt is discontinued. Skunks in captivity do most of their digging directly against the fence, because the dirt from the refilled ditch is loose, but they will desist upon encountering the wire turn-in or rocks, unless the latter are small enough for the animals to roll out.



A skunk ranch complete, for open field development.

If the trench for the enclosure is dug to hard earth the stone or layer-wire for the turn-in is unnecessary if the wall fence thoroughly intersects with the hard bottom; in this case the trench need be only deep enough to reach a solid foundation.

See also "Family Developing Pens."

BREEDING PENS

Individual breeding pens for each male breeder must be built inside of the general enclosure because the male breeders must be kept separately. The females may be kept in small breeding units of two or three to each pen, but they really should be kept separately while the young are small. These breeding pens should be at least twenty-five feet by ten feet in dimensions; larger ones would be much better. The fence construction must be the same as described for general enclosure, except that the barbed-wire at the top is not needed. These pens must have both inside and outside turn-in at the top because the breeders must be retained within the breeding pens, and the animals within the general enclosure must be kept out of them.

These breeding pens may be built with the ends intersecting with the main fence, which would save considerable wire and labor especially if the trenching for both is done at the same time.

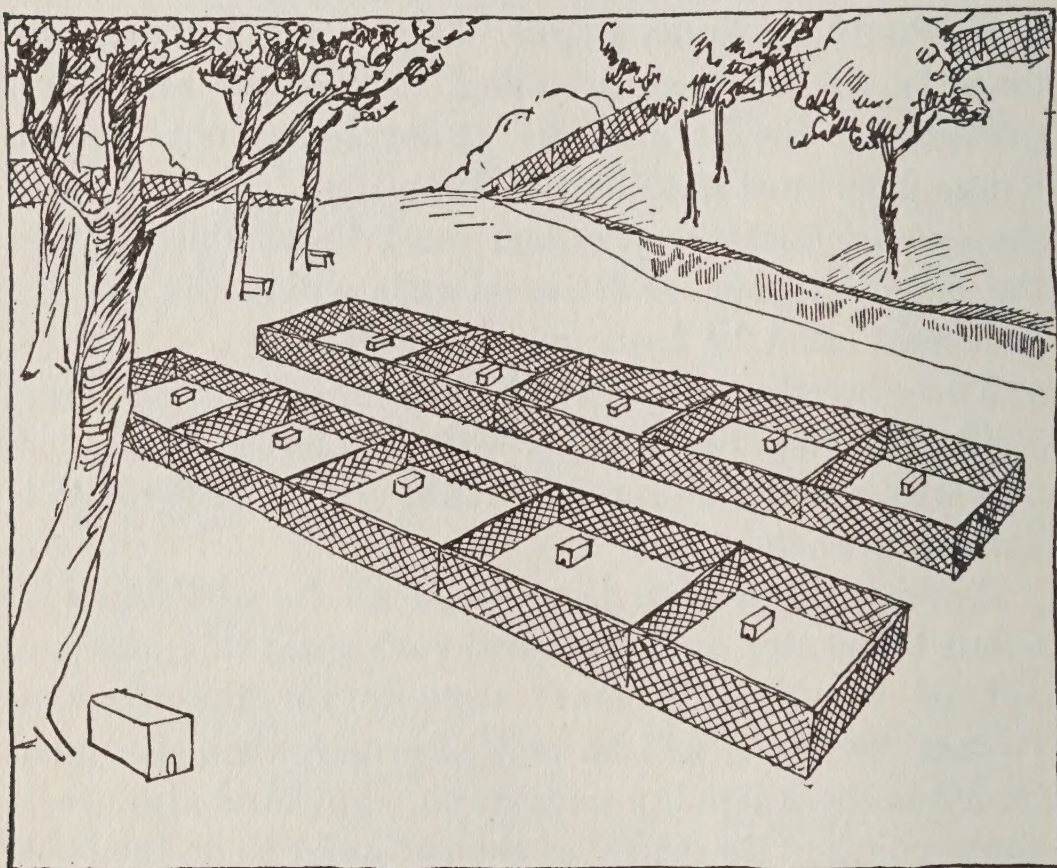
Another good plan is to build all females' pens in about the center of the general enclosure; this will permit of considerably more runway for the growing youngsters, but it will be more expensive than that mentioned in the foregoing paragraph. It would also necessitate going to the center of the enclosure to do the feeding, which, however, is of indifference to the skunks because these animals are seldom ever disturbed by the presence of visitors, especially of the attendant.

It is really better to build pens for male and female breeders as far apart as possible, because, when the females become mothers they realize that the males would kill their young if they could reach them. If they are

too near each other the females would be under a nervous strain from constant fear, which tends to affect their normal condition and may render them incapable of properly nourishing their families.

INSIDE ENCLOSURES

After the general enclosure and all breeding pens are constructed, the entire ranch, including the breeding



A skunk ranch complete, with breeding pens built in the center of it.
(Open field development.)

pens, should be sown heavily with white clover of which skunks eat liberally throughout the spring and summer months. A few scattering hop-beds also should be planted in the productive parts; these will serve to attract countless numbers of hop-worms before the spring

litters of skunks are liberated in the main enclosure in midsummer, from which they will be almost self supporting—in keeping with nature's own provision. The hop crop may be sold at a profit great enough to support the ranch.

Lighted candles or oil burners scattered over the ranch will also attract thousands of bugs and beetles which will contribute almost wholly to the menu of skunks from the beginning of summer until late fall. Mulberry trees and elderberry bushes should be planted in the breeding pens at intervals close enough to permit the limbs to cover all breeding pens; the mother skunks and their families will practically live upon the berries from early spring until they are liberated within the main enclosure; the trees will also provide shade in summer. Intermingling weeds and shrubbery add considerably to their comfort and contentment.

If the main enclosure takes in part of a small stream or lake it furnishes a constant supply of fresh water and provides the animals with opportunities to bathe, which they enjoy in summer. Skunks swim to some extent, as do all wild animals, but they never dive, so the fence construction through the water need not be underground beyond the low water mark. It should reach the bottom completely at all places, because if the stream should go dry, permitting them to see daylight beneath the fence the animals would surely scratch under it. Skunks seldom attempt to scratch or burrow in a creek or lake bed; their natural instinct is to burrow entirely above the high water mark. Yet, many thousands of them drown each spring where they construct their dens in low lands which overflow, and the young and old both perish.

The general enclosure of three acres should be ample space in which to raise and develop from fifteen hundred to sixteen hundred skunks yearly. This production would necessitate retaining about two hundred and fifty female and thirty-five male breeders. About one hundred and twenty-five females may remain permanently within the general enclosure, making it necessary to build not more than about one hundred and twenty-five breeding pens for females, or a total of one hundred and sixty breeding pens. As there are 130,680 square feet in three acres of land, and assuming that the breeding pens were built in dimensions of five feet by ten feet each, 8000 square feet of space would be consumed by these pens, then there would be a remaining 122,680 square feet of space within the general enclosure, each range animal having access to the whole of it. Or, if the space were apportioned, there would be about 76 square feet of runway for each animal, based upon the production mentioned.

As soon as the young in each breeding-pen are weaned, they are to be liberated in the general enclosure with those that are already in it, where all of them are to remain until the pelting time in mid-winter; it is there that the animals and their furs are developed to superior specimens. Exercise in the open, accompanied by judicious feeding are the prime factors in developing skunks and their furs.

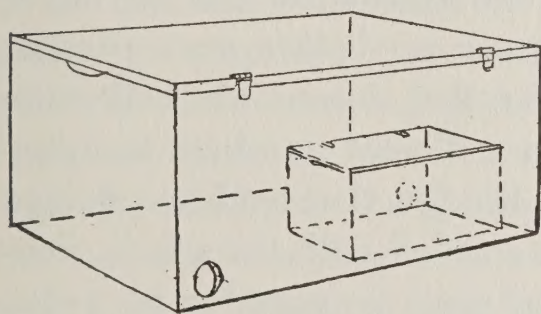
If the prospective ranchman is possessed of sufficient inventive ingenuity to conceive a more convenient or more economical way in which to equip his ranch, it is suggested that he do so, because the particular plan of arrangement is primarily to retain all adult male skunks permanently in individual pens, also all females with

young either in individual pens, or in family developing pens until they are weaned.

NESTS FOR BREEDING PENS

A very good den for skunks is made in the manner of a box-within-a-box, with a mesh wire bottom. This forces the animals to nest on the earth, which is essential to good furs; the general construction of these boxes, otherwise, should be as illustrated and described under the caption of "Animal Dens Construction."

The outer box, unless very heavy, should have a stake driven down on each side of it, so that when the young skunks are large enough to run about they will not push it all over the pen. The inside nesting box need not be more than about ten inches wide, fourteen inches long, and ten inches deep. A few inches of dirt should be packed around inside of each box to prevent water from running in during hard rains, causing damp, foul, nests.



Nest-box for skunks.
A box-within-a-box.

The dimensions of the outer box are unimportant, just so the box is large enough to permit of easy passage from its entrance around to the entrance to the nest box. If it is six inches longer, six inches wider, and six

inches deeper than the nest box, it will furnish plenty of room and permit a good circulation of air.

There should be slight openings for ventilation under the ends of the lid on the outside box; these openings should be so arranged that water cannot run into the box. This is easily done by beveling the outside of the

box or making the lid so that it will extend over the ends about an inch; then hollow out the space about three-fourths of an inch wide by six inches long, for ventilation.

The entrance to both of these boxes should be about four by five inches, with the sides slightly concaved for easy passage. The edges to all entrances, as well as the projecting corner of the inside box should be well rounded and sandpapered to prevent skunks from doing damage to their furs when they scrape against them. The adults are heavy, clumsy animals; the damage they do to their furs in the wilds, as well as in captivity, is surprising. The sharp edges break off the guard hairs, or top hairs, that contribute the gloss, or lustre, to all pelts, by which their value is largely determined; the under-fur is never glossy.

For this, and for other reasons, a really *Number One* skunk pelt is seldom if ever brought in from the wilds. Many are brought in that are graded by the fur buyer as being number one, because no better ones present themselves or so few appear that a separate collection of them can not be made in sufficient numbers to interest the buyer, consequently, the few that could be classed as *Number One* are simply graded with the whole, contributing nothing to the trapper's average for his pelts.

All nests should be arranged in high, dry, well-drained places, and supplied with plenty of hay, dry leaves, old rags, cotton, etc., with which the animals may make their nests where they will be kept warm, dry and free from drafts. They will then remain contented, healthy, robust and vigorous. If they are subjected to adverse conditions they sometimes contract pneumonia, from which they frequently die unless they secure im-

mediate attention. Do not supply animals with straw for bedding; it is not warm.

Thousands of fur animals in the wilds die each season from poor living conditions; but they are always buried in their dens, and we seldom know when these deaths occur.

If small boxes with openings in each end and a little sand sprinkled in them to cover bottom, are placed within the breeding pens, it will be astonishing to observe how quickly skunks will learn to use them for depositories for all refuse. This keeps the floors of the pens clean; to lift the boxes out of the pens and empty the sand is an easy matter. These boxes need be only large enough for the skunks to pass through, or say about 12x12x14 inches.

DENS FOR THE MAIN ENCLOSURE

Dens, or nesting boxes for the general enclosures may be of the same construction as those for the breeding pens. As a matter of economy the same nest boxes that are used in the breeding pens may be used in the general enclosure also, by transferring them at weaning time, with the family to the general enclosure, and returning them to the breeding pens after the animals have been pelted or at breeding time in the early spring.

Desirable dens may be made from hollow logs cut into about four feet lengths, split open and inverted, with one end made air tight to prevent drafts; but the double box arrangement is recommended, because it provides shelter, keeps out cold, wind, light, and furnishes shade in summer, keeping the nests cooler; also it may be transferred more conveniently.

The end where the two boxes are fastened together

should face the east, with a south entrance to the outside box. This makes the nest warmer in winter and cooler in summer; furthermore, these animals make the entrance to their nests from the south wherever possible, by digging in the south side of embankments, hills or slopes, where the snow melts away more quickly, leaving the surroundings dryer and warmer generally.

The general construction of these boxes should be about as described under the caption of "Nests" for breeding pens. The inside box should be so fastened within the outside box that it may be lifted out at any time. This arrangement facilitates transferring the entire family with the nest in one operation, which will often be necessary.

BREEDING

Skunks are polygamous mammals that breed but once a year as a rule, but a second litter may be procured occasionally if the first one is lost early in the season. One male is sufficient for about six or eight females, but a physically stronger progeny would probably result if he were associated with a less number. They breed almost any time between February fifteenth and March fifteenth, depending upon climatic conditions. Their young, ranging from five to twelve at a litter, are born about nine weeks later. They are blind and hairless at birth; their eyes open three or four weeks after birth.

Even though young skunks are hairless when born, their future markings are easily predetermined by the pigmentation of the skin. That is, wherever the skin is black the fur will always be black, where it is white the hair will be white. The mother usually weans them at about eight or ten weeks of age.

Not later than February tenth, all females (except the ones to remain in the general enclosure) should be placed in the individual pens where nests must be provided.

About March first or a little earlier, the attendant should be especially alert to mate his animals at the opportune time which nature provides, because, in being positive that they are all bred lies the only assurance of a full production.

In all cases where it is possible, the young of either sex should each be mated with one about two years its senior, for increased stamina in their progeny.

Skunks are useful as breeders for six or eight years, but they should not be retained as such for more than, perhaps, five years, unless in the case of a female that habitually brings large litters.

One female should be placed in the pen with a male each day, never take the male to the female. If the pens are in adjoining rows several pairs may be together at a time, but close watch must be kept over them by parading to and fro, in front of the pens, so that if any of the females show much disposition to fight off the male they must be separated at once; otherwise either one would likely kill the other. Sometimes they so wound each other that both die. If it is necessary to remove her, she may be returned to a male within a day or two when she will probably be more receptive.

In no case must the female be left over night with the male, for in most instances one would kill the other; if allowed to remain together after mating they would surely do so.

The attendant should continue the breeding process until he is sure all have been mated, including those that

might have been left in the main enclosure; otherwise, he cannot hope for a full measure of production.

The idea of leaving some of the females (about fifty to an acre) in the main enclosure, is to provide more running space for them and to dispense with the necessity of building so many breeding pens. Those that remain within the enclosure are so few, compared with the space, that there is no danger of overcrowding, or of one mother gathering in too many of her neighbors' children. Each mother should be fed directly in front of her own den until the young are thoroughly weaned.

There are four distinct grades of skunk pelts, and of skunks. The relative value of each is determined largely, if not wholly by prevalence of the white, provided they are all prime. Those having the least white will at all times command the greater price. They are graded No. 1-2-3-4 numerically. Descriptively, they are designated as Split-caps, Stars, Narrows, and Broads, respectively. The split-caps grade No. 1, the others following in the order given.

It should be the aim of the attendant to produce a herd of *Split-Caps Only*. To do so requires but little effort. For instance, if the broad-side female is bred to the split-cap male the progeny will be narrows. If the female narrows are bred to split-cap males the result will be stars. Then if the female stars are bred to male split-caps all of the offspring will be split-caps, except that now and then there may be a star or perhaps an occasional narrow stripe among them. This would be immaterial, however, since there is so little difference between the selling price of split-caps and that of stars.

Except for an occasional specimen, a strain of pure black skunks devoid of any white marking has not as

yet been developed, the nearest approach to it being the split-cap. To produce the albino, or pure white, is merely a matter of breeding the whitest to the whitest of the related stock. Occasionally what is known as a red skunk appears; that is, the glossy guard hairs that would otherwise have been black are of a dull, rusty, reddish cast, although the animal bears the usual white markings. However, both the red and the solid black skunks are of extremely rare occurrence.

I have heard the opinion expressed that breeding polecats to skunks will cause sterility in the progeny. Just whether or not this mating would result in infertility I do not know, for I have never retained a polecat, but I have met one face to face, in the wilds.

There is a certain species of skunks found in eastern Texas and Louisiana, which are generally of smaller build than the larger-bodied variety of the northern states, but have remarkably long bushy tails which, in many instances, are longer than the animals themselves. If males of this variety were mated to females of the northern type, the progeny would undoubtedly present very attractive specimens.

FEEDING

Skunks in the wilds live principally upon bugs, grubs, worms, snakes, beetles, frogs, grasshoppers, crickets, young rabbits, fieldmice, woodworms, green corn, berries of all kinds, white clover, timothy, fruit, melons, sweet potatoes, and other vegetation. They like corn-bread with milk, any kind of bread with thick gravy made of flour and skimmed milk, table scraps of any kind, bread with milk, and mush with milk.

All animals, skunks included, must have some vegeta-

tion either raw or cooked, such as carrots, parsnips, turnips, potatoes, melons, plums, grapes, or berries. Carrots are generally beneficial to animals because of the iron they contain. Sometimes it is difficult to teach skunks to eat raw carrots or other vegetation, but vegetables may be made into a combination cake for them about every three weeks,—that is, enough for a three weeks' supply may be made at one time. For the recipe, see "Animal Biscuits."

Of course, rabbit is the best general meat diet for skunks, or for any other carnivorous animals, but it is not always available; in its absence the animals should, occasionally, have an egg, mouse, rat, guinea-pig, chicken, pigeon, woodchuck, or groundhog (as some call them); fresh chicken heads, feet, or entrails are also relished by these animals.

All meat fed should be as fresh as possible. They are fond of fresh liver; this being rather laxative it should not be fed too liberally (except to the females at the time the young are expected.)

A little molasses fed on the cereal food to animals of any kind is beneficial in developing the fur, and will greatly enhance the silky effect of it. The animals will soon cultivate a taste for the molasses. Skunks do not care for fat meat of any kind.

No skunk, male or female, should be fat at breeding time, but for a few days before mating both should be fed fresh beef scraps which heat up the system. This is conducive to a greater readiness to breed, and a possible tendency to produce larger litters.

All females should be fed liberally, each day, with fresh milk, beginning a few days before the arrival of their young; this should be supplemented with an egg,

fresh liver, and an abundance of fresh water, else the feverish condition at that particular time might divert the maternal instinct to that of cannibalism. Fresh liver being a splendid laxative, should be given liberally on the day the young are born. The liver satisfies their craving for meat and is an excellent preventive against the possibility of their eating the young; the crucial period is during the first six or eight days after the arrival of the litter. The milk ration should be continued for a few weeks to assure the mother a sufficient amount for properly nourishing her family.

When the young begin to take food other than mother's milk, they should be given, all that they will consume, twice a day, until they are full-grown and thoroughly fattened for the winter. They will begin to show a more decided gain in flesh as the fall advances, becoming extremely fat at the beginning of winter.

A strange provision of nature enables them to live upon this accumulation of fat during periods of very cold weather; they do not come out until the weather moderates. Scientifically the opinion is advanced that they feel no pang of hunger during this time.

The extent of their fat is easily determined by the plumpness at the base of the tail which will be noticed by lifting them, at frequent intervals, from the time they are weaned, which the caretaker will have occasion to do. If the tail is abruptly thicker at its base, they are fat.

If some skunks appear too thin, or scrawny, they should be placed in the breeding pens separately and fed liberally, because it is likely that some of the bullies of the bunch have been fighting them away from the feed pans and they are suffering the ill effects of malnutrition.

Skunks always should be lifted by the tail by grasping it as near to the base as possible and gripping it with equal firmness with all parts of the hand; held in this way it prevents the skin from slipping on the tail-bone, which would cause pus to form and become so painful that the animals would gnaw their tails off to relieve it. They should not be lifted any more than is absolutely necessary, for it injures them in many other ways.

If the ranch is located near some fair-sized town it will be found that meat scraps and overripe fruit of all kinds can be contracted for at the meat shops and fruit markets, merely for hauling them away.

Tainted meat scraps will not repulse skunks nor harm them, but if putrid, it should not be given to them unless it is boiled. Poultry deceased from any cause, whatsoever, also should be boiled before feeding it to skunks; yet, chickens that have died from various diseases have been fed to them repeatedly without boiling, with no apparent ill results.

When dry, stale bread is soaked in milk or gravy, all animals prefer it to the freshly cooked kind.

Particular attention must be paid to the caloric value of their daily food ration; the required information will be found under the caption of "Caloric Food Values" on a subsequent page of this book.

GENERAL CARE OF SKUNKS

Each male, breeder, must be kept indefinitely in an individual pen, which should be as large as the available space or circumstances will permit so that he may have as much exercise as possible.

Regardless of sex, all young weaned skunks of the same season's litters may run together in the general

enclosure with or without their mothers until time to pelt them if they are adequately fed with properly diversified foods. Those born in the general enclosure may remain there until pelting time in midwinter.

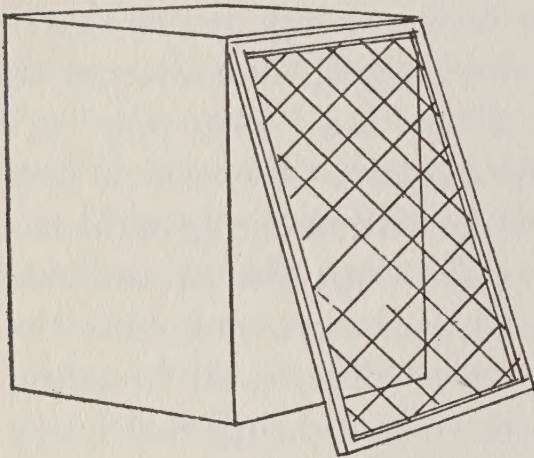
When the young are seen running around in the pens, eating liberally of solid food, they and their mothers should be dipped for vermin; within a day or two thereafter the young should be deodorized, and allowed to remain in the pens for about ten days; then they and their mothers should be dipped again, after which they may all be released immediately within the general enclosure where the young may develop; also all animals that were originally in the main enclosure must have the same treatment and at the same time. All breeding pens and dens should be cleansed and disinfected every ten days from the time the young open their eyes until they are weaned.

Before the mother skunk and her family are liberated in the main enclosure all nests that they are to occupy, if previously used, should be cleansed and disinfected. When the families are admitted to the dens they should be closed in for the day so the young can not run out before evening; then the mother will come out with them and they are not so likely to stray away and become lost.

The feeding vessels should be placed immediately in front of the nests for the first two or three days until the animals become accustomed to their new quarters; then they will soon learn to come for their food to the general feeding places which the attendant has arranged to suit his own idea of convenience and cleanliness.

A very good plan for feeding in the general enclosure is to provide several feeding boxes or tables so that all

feeding may be done on top of them. These boxes should be as large as possible and at least three feet high; provided with slanting walls or planks surfaced with poultry wire smoothly stretched and tacked down so the skunks can climb up.



An exerciser.

This arrangement affords young skunks a large amount of the exercise necessary to their development, and at the same time it keeps their food off the ground and out of the dirt. If the walls of the boxes or tables were perpendicular the animals would climb them readily, but

unless they are slanting so the animals can see where they are going after passing over the top edge of the boxes, they would not know how to get down without falling, for skunks are not climbing animals.

After they have been placed on top of these boxes and fed there they will be climbing them several times a day hunting food. Whether or not the young skunks have been deodorized, the attendant may lift them by the tail and place them upon the boxes without fear of being scented; they will find their way up, thereafter, of their own accord.

As soon as the families have been transferred to the general enclosure, all vacated breeding pens must be thoroughly disinfected in every part and corner to prevent vermin or germs from spreading to the animals within the general enclosure.

Lime should never be used as a disinfectant where the animals would come in direct contact with it unless an inch or so of fresh earth is thrown over it; lime makes their furs rough, brittle and coarse, sometimes burning it to the skin. All breeding pens should be disinfected several times before the Fall season comes on, to be certain that they are free from all parasites when the mothers are returned to bring forth their next season's litters after they are bred in February or March.

In this way, the attendant has assurance of keeping his animals in good, clean, strong, healthy condition, wherein lies the only possibility of producing superior specimens that command the better prices, if he hopes to accomplish very much in the fur raising business, he must lend his efforts to that end.

While it is true that skunks in the wilds do not get this attention, it is to be remembered that they are not living in a condition so congested that they are likely to transmit vermin or disease from one to another. Furthermore, nature has provided them with a natural intuition to eat laxative vegetation which rids them, effectively, of all intestinal parasites. This vegetation probably would not be procurable within the skunk yard, so the ranchman must have his animals attended if he wishes to be crowned with the glory of having achieved success in the skunk raising business. The effort and expense are as nothing when compared with the returns from it.

When the nest-boxes are placed in the general enclosure for the accommodation of mother skunks and their families, they should be placed at points as far apart as possible to prevent an overcrowded condition while the young are small and not thoroughly weaned, because

mother skunks will nurse each other's young indiscriminately. When any little one is out of its nest, where a mother skunk can see it when she suspects danger, she will run out and drag the youngster into her own den by the nape of the neck, regardless of where it belongs.

Females that have no young will kidnap the young of others, and take them to their own dens; she will fight the mother away until the little creatures starve because of her inability to nurse them; therefore the absolute necessity of guarding against an overcrowded condition. If in the main enclosure it is found that a few females are barren of young, they should be taken to individual pens immediately, and remated; late litters will often be the result. If not, the barren females must remain sequestered to prevent kidnaping and subsequent starvation of the young of others.

As the young grow older, toward cold weather, they will nest together in large numbers for warmth, which is supplied by the body heat of one another. The males become quarrelsome as the breeding season approaches, when they must be confined in individual enclosures or pelted in December, otherwise, they are likely to kill one another. This separation also prevents inbreeding which would otherwise be certain. Those that are separated at that time are the ones to be retained for breeding purposes, the fur crop being harvested before January.

It is, of course, at harvest-time that the superior breeding specimens are to be selected and set aside from those to be pelted, so that they may not be executed by error. Infusion of new blood into the herd may be done without expense by exchanging sexes with another ranchman who should be only too glad of an oppor-

tunity to make the exchange and thus enhance the stamina of his own herd.

CARING FOR THE YOUNG

When the young are born their presence is heralded by their continual chittering. The nests must not be looked into at this time because in her endeavors to protect her young the mother would be likely to kill them or bury them in the hay and lie on them where they would be smothered, or, she might drag them out in search of a more secure hiding place, and finding none, she would leave them out, where the little hairless creatures would die from exposure during the night.

Stay away from them until they are seen coming out of their dens at about six weeks of age; then they may be handled without fear of ill results. As soon as their eyes are open the mother's fear for their safety subsides considerably.

They should not be weaned until they are at least ten to twelve weeks old; then with the mothers, they may be liberated within the general enclosure, or, if it is desired, the mothers may remain in the breeding pens indefinitely; but it seems to be the better plan to release them with the young so they may have the advantage of the additional runway which contributes so liberally to their constitutional betterment.

Should it happen that a nest of young be found earlier than expected in the main enclosure, *they must not be molested*. If at any time there is a youngster that seems to be lost, or to have strayed away from home, which sometimes occurs in the main enclosure, it should be taken to some nest where there is a small litter, to

relieve the nursing strain on mothers with large families.

Where it is found that one litter is unusually large, and another small, they may be averaged by transferring some of them from the larger family, to the smaller. This must not be attempted until just after they open their eyes.

MOTHERS EATING THEIR YOUNG

This occurs within the first few days after they are born; it is from either of two causes, possibly from both: The usual cause is the mother's nervousness due to persons looking into the nest while the young are small, or it may be the result of a continued sameness of food in which she fails to get enough fresh meat or fat to satisfy her carnivorous appetite—Diversify The Food—and give a judiciously balanced ration.

CANNIBALISM IN THE MAIN ENCLOSURE

Cannibalism within the general developing pen is prevalent among skunks just prior to cold weather. This is caused usually by suddenly discontinuing a long period of feeding a large amount of fresh raw meat, for which they have a craving at this particular time, due to an intuitive provision of nature for them to accumulate fat upon which they subsist during long periods of inclement weather when they enter a state of semi-hibernation.

Close watch should be kept over all skunks in the developing pen at this time, so that when one shows signs of being quarrelsome it should be immediately confined to one of the individual pens. *No chances should be taken*, because, if one starts cannibalism it is likely to spread to others of the herd; then they would have to

be confined, five or six in each pen to prevent a wholesale slaughter among them.

As a precaution against destroying one another by fighting, it is well worth the cost to build several individual developing pens of about twenty-five by fifty feet in dimensions so that when a male skunk shows evidence of being a trouble-maker he should be relegated to one of these pens, which would be large enough for him to gain sufficient exercise to develop his frame and his fur. These individual developing pens may also be used for breeding pens in the spring, wherein two females and their families may be kept until pelting time in mid-winter.

It is invariably some ill-tempered male skunk that does the fighting and killing which introduce cannibalism into the skunk yard. An observing attendant will have no difficulty in determining which ones have the more combative temperaments, at feeding time. It is usually a stronger male, habitually fighting a weaker male from which he gets a taste of the flesh when he kills it. If plenty of raw meat is fed from late summer until pelting time in winter with proportionate diversification, cannibalism within the skunk yard is not very likely to occur.

DEODORIZING

When skunks are deodorized, or disarmed, by removing the scent sacs, the rancher realizes a much greater revenue from them through sales of many of his animals for pets or for mousers to rid stores, basements, barns, granaries or warehouses of rodents and all obnoxious insects, such as roaches, crickets or water bugs, for which they have no superior. Furthermore, there is a ready

demand for fine specimens of skunks for foundation stock, from many people who wish to enter the fur raising business. The sale price for this purpose is always much greater than that for the pelt.

If the animals are not deodorized, much difficulty may be experienced in getting the express company to accept them for shipment; but where the animals are ranch raised for their pelts only, and not intended for shipment, the attendant may entirely disregard the probability of their scenting with reasonable assurance of no special nuisance arising from that source.

The operation in removing the scent glands or sacs from the adult skunk is much more difficult than it is with the young, and accompanied with considerably more danger of injury to the animal. When the young are about three or four weeks old, or as soon as they begin running about in the pen, the operation may be performed upon them without fear of ill results.

Deodorizing does not in any way interfere with their fertility. The wound from the operation heals within a remarkably short time (almost over night), except in some case where the sac is cut or bursts, permitting the fluid to come in contact with the flesh; then it will not heal so quickly.

As an orderly procedure for successfully removing the scent sacs from skunks two persons are necessary; one to hold the animal while the other operates upon it, as follows:

1st.—Both holder and operator should rub lard or vaseline over their hands, forearms, and well into the pores of the skin, so that if some of the fluid should get on them, it may be completely removed by washing in gasoline.

2nd.—The holder should lift the skunk by its tail with his left hand, grasp it around the neck with the thumb and forefinger of his right hand, letting its shoulders rest directly in the palm. Then catch the tail from the under side, close up to its base with the palm, second, third, and little finger of the left hand, using the left front finger to so direct a small cloth that if the animal tries to throw the scent-fluid its force will be effectively checked, preventing the operators from being scented.

3rd.—Both holder and operator should be sitting on chairs or boxes, directly facing each other. The holder should lay the animal across his knee, holding it all the time as mentioned.

4th.—The operator should begin by sliding his left front finger under the cloth, placing the finger and thumb in the exact position, as shown in Figure No. 89. The thumb is placed firmly in position, about one and one-half inches back, horizontally from the front fingertip. Then, by pressing down with the thumb, and slightly down and forward with the left front fingertip, the exact location of the sac will be determined by its bulging up against the skin from beneath, directly between the thumb and finger.

5th.—Operator should begin by making an incision through the skin, with his operating knife, about $\frac{3}{4}$ " long, beginning about $\frac{1}{2}$ " from the left finger-tip, and extending directly over the sac and straight across toward the

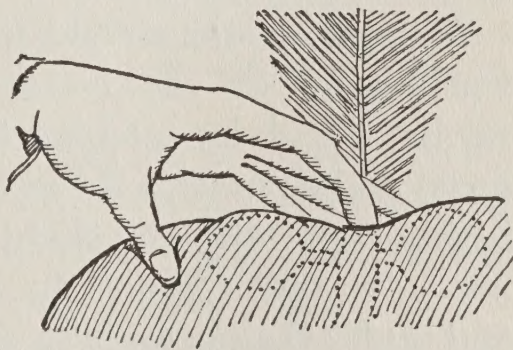


FIGURE NO. 89.

Exact positions of fore finger and left thumb in locating the scent sac.

thumb, cutting through the skin, then very carefully through the red enveloping muscles to the white egg-shaped sac, which will appear at nearly $\frac{1}{4}$ " from the surface, slightly bulging its way upward through the

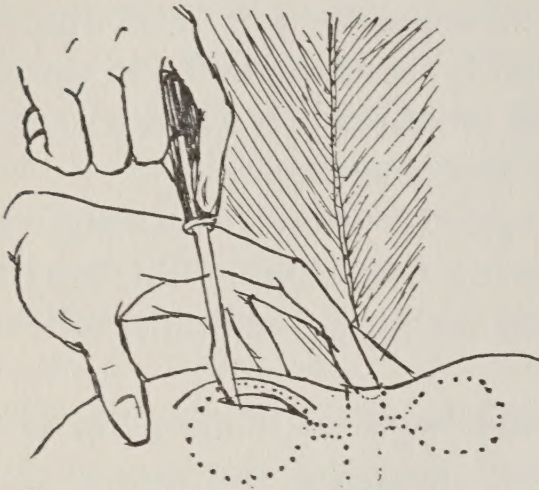


FIGURE No. 90.

The incision through the skin and enveloping muscles to the sac.

incision, as in Figure No. 90. Then care must be taken not to cut or puncture the sac while cutting the flesh back over its socket; the flesh here must be cut to the ends of the incision so the sac may be removed.

The holder now uses the cloth again to prevent being scented while the operator uses

both thumb and finger in working the sac through the incision, and out of its socket to the surface without bursting it, if possible.

6th.—Operator should use a small pair of pliers in working out the sac; he begins at the outside and nearest the thumb by catching the sac with the pliers as far down and as near to the extreme end as possible; gently lifting it upward, and slightly forward, at the same time using the dull edge of the knife to push the flesh back and under the sac on both sides of the incision until it is lifted completely out. Then the sides of the incision will close around the duct retaining the sac in place, fully upon the surface, as in figure No. 91.

7th.—Operator should gently lift the sac with his fingers, clamp his pliers around the duct between it and

the skin, by slightly lifting the sac with the pliers; he ties a short piece of white twine tightly around the duct immediately below the point at which the pliers hold it. Then by lifting the sac up and carefully pushing the flesh back, the operator follows the duct to a point where it becomes suddenly thicker where it intersects with a wall containing nerves which lead to the spine where the scent fluid is generated. The duct should then be severed at about $\frac{1}{4}$ " back from where the wall, or thick part begins.

If the operator should accidentally cut into this wall, paralysis would likely follow; when the animal might as well be destroyed; if too much of the duct is left there, however, it will fill with scent fluid which the skunk can use in a limited way to repulse its offenders. The string is tied around the duct merely to prevent the scent-fluid from leak-

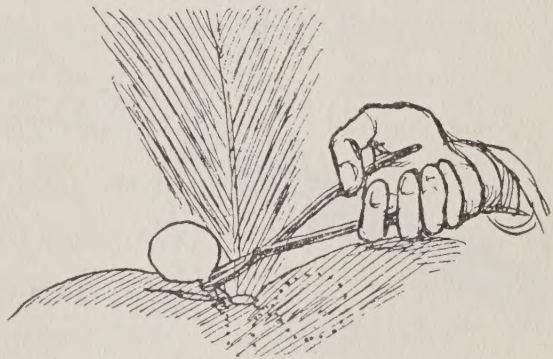


FIGURE No. 91.

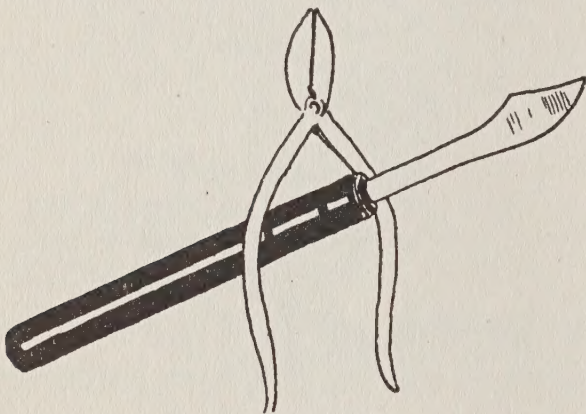
The scent sac fully exposed upon the surface.

ing out, to the annoyance of persons in the immediate vicinity; also to retain the fluid in case it is wanted for a commercial purpose, for there is a good market for all of it at from \$2.00 to \$3.00 a dozen sacs.

8th.—To remove the other sac, the operator proceeds as explained in the foregoing, except that as a matter of convenience the holder may reverse the position of the animal so the operator will not have to work left handed. Skunks offer little or no resistance to the operation, which is bloodless, and, to all appearances, painless.

They seldom attempt to throw the scent during the course of operation.

Sometimes, especially as the animals grow older, a sac will be found difficult to dislodge from its socket, caused by two small cords about the size of a pin which form and connect the lower side of the sac to the under-wall of its socket. When this is encountered the cords must be located and severed so that the sac may come through freely, to the surface. These cords will seldom be found in skunks under two months old; but, that is about the age at which the cords begin to form.



Operating knife and pliers.

All that is necessary for the operation is a small pair of pliers and a very sharp knife with the point ground off to prevent puncturing the sac while opening the flesh from around it, to the ends of the incision in the skin.

First, prepare a five percent solution of carbolic acid with water, place the knife and pliers in this solution and heat it to about the boiling point before beginning to operate; then when the solution cools off so that it is not uncomfortable to the hands, use a cloth saturated with it and swab the skin all around where the incision is to be made, and wash the wounds with it after the operation is performed, as a precaution against possible infection. In laying down the knife or pliers during the course of operation always place them in the pan containing the solution—not elsewhere.

After the skunks have been operated upon and the wounds well washed with the solution, they will need no further attention, unless, in some case where a wound is slow in healing; in that event grease the wound with a moderate solution of carbolic acid and lard; this assists nature in its course of healing and is a safeguard against possible annoyance from blowflies.

Some authorities advise against deodorizing skunks, claiming that a large percentage of the animals die from the operation. Direct experience proves that there is no excuse for losing any of them except through malpractice. If the foregoing instructions are followed, there should be no losses from this source, nor should the operation be responsible for any other ill results.

DISEASES

Skunks are strong, healthy animals that are subject to very few ailments. As a rule, when they are sick they stay in their dens, seldom coming out until the disease has reached its chronic stage; then, especially if it is in winter when the pelts are salable, it is the part of wisdom to pelt the animal at once, thereby dispensing with the time and effort advanced in attempting a cure, and also preventing the disease from spreading to others of the herd. These diseases seldom occur; when they do, fortunately, it is almost invariably in winter when the pelts are prime. But, if the animal dies of natural death, its pelt will not be of normal value.

Intestinal worms and vermin are about the only things which may cause the attendant any concern, if the animals are kept free of drafts. Putrid meat or too much milk for a long period, might cause laxation, while a continuous all-meat diet, particularly of horse flesh or

beef, will invariably kill every skunk; but, there is nothing better for them than these meats if they are diversified with other foods.

If too much milk is the cause of laxation, the animal should have neither food nor water for about forty-eight hours, after which time the disease will, usually, disappear of its own accord.

If putrid meat is the cause of laxation, the foregoing treatment may suffice; but, if the case is a severe one, as it usually is when caused from that source, each animal so affected should have about one-half teaspoonful of castor oil beaten up with a raw egg; after which keep them fasting until the trouble disappears. They should then be fed sparingly on raw, lean meat; gradually increasing the allowance until a full ration is given. Diversified diet is the safeguard.

Following a severe case of laxation, skunks sometimes develop protruding parts, terminating in death if the condition is not remedied. Remedy: use a clean, white, soft cloth well greased with lard to cleanse all dirt thoroughly from around the parts affected; then with a well greased finger push the protruding parts back into place, where they will remain, thereafter; this trouble will not recur in the same animal.

Skunks sometimes contract pneumonia, especially in the early spring. This trouble can almost invariably be traced to damp, cold, drafty dens. The prevalence of this disease is easily discovered by the slow, staggering movements of the animals, and by their refusal to eat. Their convalescence is equally manifest in their return to activity and appetite. This disease is of rare occurrence among skunks, but if they do contract it, the first aid is warm, dry, draftless dens that are well ventilated;

the animals should then be given a dose of castor oil, after which, in most cases, they will recover. If the case is severe they should have, in addition to the oil, a hypodermic injection of oil of camphor given in the underside of the hind leg, just above the hock. This disease is likely to prove fatal unless it is properly and promptly attended. *Use judgment; don't be careless.*

Inasmuch as young skunks are so frequently troubled with intestinal worms, the attendant should never wait until the signs appear. To treat them for these parasites, mix a handful of common stock conditioner (procurable at almost any drug store) with an ordinary dishpanful of their food; then as the animals are fed it is reasonably sure that each one will get its share of the remedy in an effective proportion.

This remedy should be given to them about every thirty days during summer; in addition to being a worm eradicator, it is very good for the animals in other respects. One to ten grains of powdered kamala given on food every fifth day until four doses have been given is also an excellent remedy for worms.

Skunks are also infested, at times, with vermin, especially while in the breeding pens; vermin are so very destructive to growth and vitality of young animals that care must be taken to exterminate them. A solution of about seventy parts of water to one part of stock dip, well mixed in some convenient vessel, such as a wash-tub, in which all young animals and their mothers may be immersed just before the young are to be deodorized, will destroy these parasites. The nests and pens should also be disinfected at the same time.

Give them this same treatment again in about ten days, and a third treatment on the day that they are

transferred to the general enclosure. All skunks, male breeders included, should be so treated. This treatment is good for their furs and keeps the animals in a strong, healthy condition which is the real keynote to developing desirable pelts, or to successful ranching. The solution does not damage their eyes, nor do they swallow it.

Each time the animals are dipped, and before they are returned to their nests, all hay or bedding must be removed from the dens and burned; then the nest-boxes and entire breeding pens must be disinfected thoroughly; otherwise, the desirable results would not be obtained.

The use of a good insecticide is another very effective way of ridding skunks of vermin. Dust it thoroughly into the furs once a week for about three weeks, being particularly careful to dust well about the base of the tail and around the back of the neck, for it is these places that the vermin frequent mostly—*always do a complete job, or none at all.*

Sometimes a young skunk will get choked on a small piece of straw, or bone; if unassisted, it will starve. The animal should be caught and held while the offending article is removed with a small forceps.

If skunks are maintained under unfavorable conditions during winter, they will sometimes contract distemper from which they die if not attended immediately. The disease is very contagious and any animal so affected should be isolated immediately; if the case is severe it would be the better way to pelt the animal at once and burn the carcass rather than to attempt a cure.

Symptoms—Swollen, mattery eyes, refusal to eat, hard breathing, shivering, mucous in nose and throat;

the underfur is moist with a yellowish accumulation on the skin from which is emitted an offensive odor; there is also a watery discharge from the nose at first, but it soon becomes thick and closes up the air passages entirely. When this disease is discovered in its first stages it responds to treatment very readily and is easily cured.

Treatment—The first aid is new, clean, properly ventilated quarters; then about three grains of aspirin should be given three times a day until the fever is broken, after which the animal will soon recover. Each animal so affected should be fed on warm milk, sparingly, twice a day, with about half an egg beaten up with it. If the animal does not show improvement within a reasonable time—pelt it. The disease does not recur in the same animal.

Mange—This sometimes appears on skunks that have been allowed to occupy damp, foul, unclean nests. Three or four treatments of the dip solution, at daily intervals, for about a week will cure them. The solution should be made lukewarm before the animals are dipped in it—*sanitation is the prevention*.

Newly procured skunks should be retained, in the quarantine station, for at least two weeks of observation, to determine whether or not they are infected with any of the ailments common to their kind. During this period of isolation they should be dipped for vermin at least twice, and should be treated also for worms. Then if they show no signs of ailment the attendant may feel reasonably sure that they are in proper condition to be admitted to his ranch. See information under the caption of "Quarantine Station."

SKINNING AND CURING

(See caption of "Skinning and Curing.")

THINGS TO REMEMBER

Adult male and female skunks must not be allowed to run together over night; it is dangerous.

Each adult male breeder must be confined to an individual enclosure at all times.

Adult females may run together in one large enclosure, but it is better, for many reasons, that each one be confined to an individual breeding pen while she is raising her young.

All females with their families may run together from the time that the young begin to eat solid food, until about December 15, when all males must be separated from the females to prevent inbreeding which would, otherwise, be certain, and to guard against their destroying one another when the breeding season approaches.

Young males and females do not become dangerously quarrelsome until shortly before the first breeding season, but they are likely to kill one another, at any time of the year, thereafter. The males would kill each other if allowed to run together until mid-winter.

In shipping, however, a number of males and females may be placed in the same box without ill results; their minds, apparently are diverted by the excitement of being transported, or by the strange surroundings.

Skunks that are sold for breeding stock or for pets may be shipped at any time after they begin to eat liberally of solid food.

Skunks that are to be pelted should be taken between

December 1, and January 1, when the furs are at their best.

All skunks that are to be pelted must be liberated in the main enclosure as soon as they are thoroughly weaned; there they will develop to a degree superior to any in the wilds, if they are properly nourished, as explained under the caption of "*Feeding*." If they remain in the small breeding pens and nest in wooden boxes *they will not develop attractive furs*.

Nesting on the ground, exercise in the open, and judicious feeding develop their furs to superiority.

An all-meat diet, especially of raw horse-flesh, or of beef, if continued for a time, will kill every skunk.

Skunks' sleeping dens must be warm, dry, and free from drafts.

It is a mistaken idea that nature has provided all fur animals with adequate coats of fur with which to withstand the cold. They must have protection from inclement weather, just as man must have it; otherwise they will die—usually of pneumonia.

A supply of fresh water *each day*, especially in summer, is essential.

No animal should be allowed to eat putrid or tainted meat of any kind at any time, unless it is cooked. The idea that skunks should have such food as dead-horse carcasses, is as odoriferous as the putrid flesh itself—merely because they will eat it is not sufficient reason why they should have it—children will eat poison if it is given to them.

All animals that are to be retained for breeding purposes should be selected as soon as possible and marked, (see "*Marking Fur Animals*"), so they will not be killed by error while harvesting the fur crop.

As soon as the skinning season is over, all remaining breeders should be fed sparingly so they will not be too fat at breeding time.

All females with young should have a little fresh milk with mush each morning, in addition to their regular evening meal, until the young are weaned, thus enabling the mothers to give their young sufficient nourishment to develop them.

Never lift an adult skunk by the tail unless it is absolutely necessary to do so for it is injurious to the animal. Skunks should be handled by means of the transfer box, or by driving them; but, if it is not a deodorized herd, the rudimentary measures of safety might demand that they be not driven too rapidly lest some careless "ill-tempered skunk" becomes indignant and rudely resents the rush with—"*things to remember.*"

THE CAVY

Commonly Called "Guinea-Pig"

This little animal is strictly a vegetarian, native to South America where it was first discovered by the ancient Peruvians. They are now raised for various purposes in all parts of the world. They make interesting



Types of Guinea-pigs.

and perfectly harmless pets, and are largely used in the laboratories for medical research and for many other scientific investigations.

The Cavy is commonly known under the name of "Guinea-Pig." But since it possesses neither feathers nor a tail, and as it bears no resemblance to either a pig or a guinea, the exact origin of the name would present a problem rather difficult to solve. It is quite possible, however, that the appellation "guinea" sprung from a crude attempt to pronounce the name "Guiana" where the animal was first found, and where it was propagated

by the aborigines of the province who highly prized its flesh as a choice table delicacy.

The reason why the name "pig" is affixed is unknown, but in all probability it is applied because of the animal's little grunt and squeal which so characterize the pig, and because its spotted body resembles the more common breed of pigs (known in Arkansas as "rail-splitters" or as "razor-backs").

Whether or not the corruption of Guiana with the characteristic grunt and squeal of the pig are coincident with, and responsible for coining the name, it does not by any means contribute the tale of the guinea-pig—for as yet, this little animal has no tail.

The guinea-pig is a very timid little animal, extremely prolific, but seemingly destitute of intelligence. Each member of a family is differently but beautifully marked in variegated red, white and black colors. Guinea-pigs are by no means vicious, and never display a disposition to bite, or to otherwise combat their captors. They are perfectly harmless to either the young or old of other animals. While they become extremely frightened at the sight of a deceased member of their own family, they will walk directly into the jaws of a devouring animal without suspecting danger.

It is not for the purpose of a fur production that this animal is mentioned here, for they do not produce fur. Where a fur ranch is conducted on a large scale some live animal food is necessary. Because of the low cost of production, guinea-pigs and rabbits meet that need more economically than do any other animals that could be raised, except muskrats.

THE DIFFERENT TYPES

For many years the guinea-pig was regarded merely as a pet, being bred only for show and for fancy. As a result of this hobby, several strains and modifications of the original were developed. The most prevalent in this country are the ordinary smooth-haired kinds. The Peruvian, or long-haired type, is much on the order of our angora cat, minus the tail. The Abyssinian is a type with long, coarse, stiff hairs standing out over the body in a curious rosette formation; much of this hair is turned back the wrong way, or toward the head appearing as if a windstorm had blown it backward.

The Peruvian, or long haired type, is a very attractive animal when it is kept looking nicely, which requires considerable brushing to prevent the long hairs from matting up in unsightly entanglements. While brushing will keep it looking presentable, the necessary handling is harmful to the animal.

Should this long-haired type be raised for fancy stock, the brushing is best done by placing the animal on a small shelf about five or six feet high; it is not likely to jump because a guinea-pig is afraid of height and will remain practically motionless while being brushed; this eliminates the necessity of roughly handling the animal in trying to hold it. The ill effects of handling is always evidenced in rough dead-looking hair upon an inactive, puny animal.

The Abyssinian is a peculiar-looking, unattractive animal, offering no advantage over any other of its tribe. The smooth haired animals require less attention and make equally attractive pets; there is an advantage in raising this type in that they are more easily kept, and

bring to the raiser a revenue just as great as any other—perhaps greater for commercial purposes; and because of their short smooth hair, they make much more desirable food to be given alive, to the fur animals.

THE SALES MARKET

There is a large demand for guinea-pigs by manufacturing chemists and research institutions that use many of them for scientific medical investigations, and in standardizing antitoxins and serums; for these purposes immature animals weighing only about nine ounces are required; a weight which they will attain at about six weeks of age.

The firms consuming these animals usually contract for their yearly needs in advance. While the price paid for them varies according to governing conditions, as is the case with all other commodities, it is usually around 75 cents to 90 cents each. The stomach of the guinea-pig is said to be similar to that of a man.

SELECTING THE BREEDING STOCK

It would seem that the best guinea-pigs to raise on a fur ranch are the smooth-haired type, which are of several color varieties. The pure white guinea-pigs are albinos; these invariably have pink eyes, as do all albinos in the animal, bird, or human kingdom.

Occasionally some guinea-pigs will be found to be of a solid color other than white; but to maintain a solid color strain would necessitate many generations of selective breeding, because of the present contamination of many color varieties in the blood of the available foundation stock. Of whatever colors the spots might be on a guinea-pig, it will be noticed that the pigment of the

skin, in every instance, will correspond to the color of the hair; that is, where the hair is white the skin beneath it is white; where the hair is black the skin beneath it also is black, etc.

A full-grown guinea-pig should weight about two pounds if it is in good condition physically, but guinea-pigs are not of mature size under eighteen months of age. The females are commonly smaller than males of corresponding ages.

About the only thing to take into consideration when selecting foundation stock is to secure animals that are of good size, strong, healthy, quick moving, and with clear, clean-cut eyes. Animals bearing these qualifications in the entirety should quickly attain a good size, and their progeny should develop into a herd of excellent specimens.

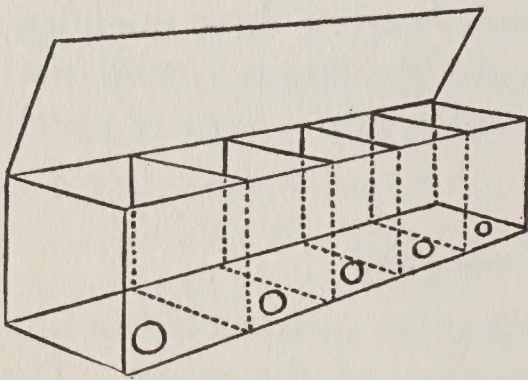
HUTCHES AND PENS

Hutches for guinea-pigs may be constructed in any manner suited to the convenience of the raiser. The most important feature is to exercise a reasonable amount of good judgment in providing dry, warm, well-ventilated but draftless dens. The hutches may be made of any kind of old packing boxes or of as much better material as the raiser may see fit to use. In any event, they should be constructed with properly arranged mesh-wire over one entire side, to permit of ventilation and an abundance of fresh air. The larger the hutches are the better, because of more runway and a better circulation of fresh air.

About two square feet of runway for every animal would suffice, but more space, of course, would be better. Guinea-pig hutches may be constructed along the

lines of those for rabbits, or in any other way that an inventive mind might conceive that would best suit its master's convenience. These hutches may be so tiered, one upon another, that almost an innumerable herd of the animals may be raised in an average basement, barn, coal shed or in a small garage.

About four or five female breeders should be kept in each enclosure with one male. Nests may be made in a long box partitioned off into five or six divisions provided with a lid as shown in the illustration forming nests about six inches wide, by ten inches long, and seven



Nest-box, for a breeding unit of five.

inches deep, with entrances about three and a half inches in diameter. The adult animals will often climb upon this box to sleep. Some raisers do not provide nests for guinea-pigs, simply furnishing sawdust or hay for bedding;

but, the nest-boxes as described seem advisable.

Guinea-pigs do better in the northern parts of this country, in indoor places, where the temperature does not reach below fifty degrees. Yet, they have been kept in the open during sub-zero weather apparently without ill effects.

I have had excellent results from raising guinea-pigs in hutches with rabbits when I was located on the Mera-mec River; these animals occupied the same nests happily, the guinea-pigs crawling in between the rabbits to keep warm; neither would interfere with the other. Yet, this might not do with all breeds of rabbits, for some of

the newly developed varieties are inclined to be a little pugnacious.

Guinea-pigs furnish an excellent meat diet for any carnivorous, fur-bearing animal. They may be given to the animals "alive" because the hairs on their skins do not ball up in the stomach, as rabbit furs are said to do. Furthermore, neither their heads nor their intestines are so subject to parasites as to affect the intestines of the fur-animals.

FEEDING

Guinea-pigs live entirely upon vegetation, such as parsley, lettuce, potatoes, turnips, beets, clover, alfalfa, or the tender roots of almost any kind of vegetation. Frozen potatoes or cabbage, if eaten, will make them very sick, sometimes terminating in death. They are also fond of oats, clover hay, alfalfa hay, celery tops, turnip tops, beet tops, lawn clippings, etc.

When guinea-pigs are fed upon a large amount of green food they require very little water—in fact, some attendants do not give the animals any water in this event, the moist contents of the green food being sufficient. But in the absence of green food, grain must be substituted to supply the necessary nutrition, and with it an abundance of fresh water must be given each day, for they will refuse to eat the grain without it.

An adequate supply of clover or alfalfa hay, of which they eat liberally, should be kept within their enclosures at all times, supplemented with some green food and with oats, bran, chopped grain, etc. A lump of rock salt should be kept within their hutches so they may have access to it whenever their systems require it. For green food in winter, cabbage, kale, or rape, may be kept in the

field in the usual way. While wilted vegetation is probably not harmful to these animals, it is not the best form in which to feed it to them. If guinea-pigs are raised and cared for exactly as rabbits should be, the results would be as good as in any other way.

If these animals are raised in barns, garages, basements, or in other places where they may be reached easily by the pestiferous house rat, the attendant should arrange the hutches so that these pests can not gain entrance to them by gnawing their way through the wooden portions to the animals within. They will destroy the food of the guinea-pigs, and kill their young—rats within the immediate vicinity are readily attracted to the hutches by the presence of the food that is provided for the guinea-pigs.

If the attendant is raising minks in conjunction with his guinea-pigs, and would permit one or two of them to run at large around the guinea-pig hutches there would be nothing to fear from rats or mice, for the minks will destroy them completely. A rat can not climb to where a mink cannot follow it.

Minks will not gnaw into the hutches, but they will certainly play havoc with the herd of guinea-pigs if they gain admission to them.

BREEDING

Guinea-pigs mature sexually at about one month of age, but they should not be allowed to breed until they are at least two months old. The period of gestation varies from sixty-three to seventy days; the litters ranging from one to five in number. The average litter is usually not more than two or perhaps three, but they will bring about five litters a year, enabling a female, in

her breeding prime, to raise about fifteen young each year. A young female's first litter may consist of but one or two, while subsequent litters are commonly larger.

Young guinea-pigs are wonderfully developed when they are born. When about two days old they begin running around in search of food other than the mother's milk. They are weaned when they are between fifteen and twenty days old, at which time the sexes should be separated; but as many as fifty or sixty of a sex may be kept in each enclosure of fifty to sixty square feet of floor space. Males of considerable difference in size should not be kept together, because the older or larger ones might injure the very small ones, which are quite delicate.

When they are about two months old the females may be assigned to breeding pens, where about five may be kept constantly with one male in each pen; better results would probably be secured with smaller breeding units, because the enclosures would not be so crowded after the arrival of the several families of youngsters.

Female guinea-pigs are possessed of remarkably maternal instincts; when several families of young arrive about the same time each mother will nurse the progeny of others indiscriminately. Occasionally, two proud mothers will become envious over the comparative cuteness of their kids, from which they become slightly antagonistic; in this event it is better to separate them, though not absolutely necessary to do so.

All hutches should be cleansed thoroughly twice a week. Hay, sawdust or dry leaves make good beds for them. Like all other animals, they should be handled only when it is absolutely necessary to do so. While in-breeding up to the fourth or fifth generation does not

seem to produce a noticeably ill effect upon them, it would seem the better plan to avoid this practice at all times.

DISEASES

Disease is rare among these hardy little animals. If they catch cold pneumonia is likely to develop; but this danger may be avoided by keeping them in places free from drafts and free from radical changes in temperature.

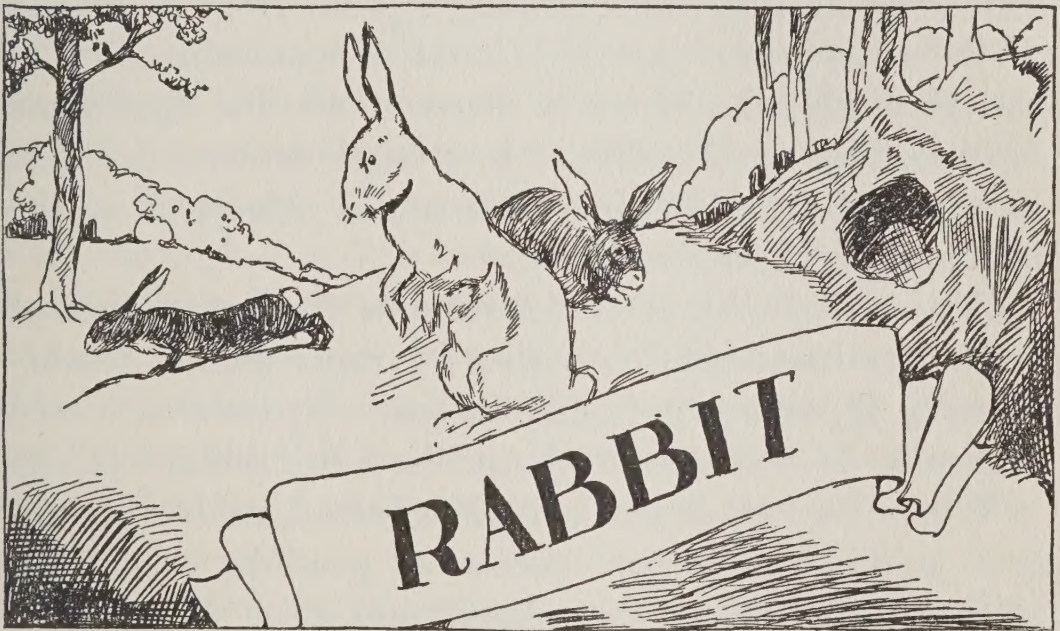
The attendant must not disregard the absolute necessity for sanitation, and dry, well-ventilated places in which to retain his animals.

Indiscreet feeding or unbalanced rations, either too much or too little, will sometimes result in inflammation of the stomach, to which guinea-pigs are subject, and which frequently proves fatal.

Sanitary surroundings, clean food judiciously fed, proper ventilation, a reasonably even temperature in spacious quarters are almost positive preventions of disease of any kind among guinea-pigs or among animals of any kind.

THE RABBIT

A domestic production of rabbits is so general in all parts of the world, and methods for raising them are so well known that it seems unnecessary to embody a lengthy article on the subject. If rabbit raising were



dealt with here in detail that subject alone would fill the pages of this book.

Raising rabbits for their furs alone would not be particularly advantageous, but because of the value of their flesh as food for the other animals, I am prompted to embody this article, for it is well known that rabbits in the wilds furnish the greater part of food for practically all carnivorous fur-bearing animals in all parts of the world.

If the ranchman intends to produce furs in large quantity, an economical food supply is one of the first prob-

lems that he must solve. As rabbits live purely upon vegetation, all of which the attendant may produce upon his own land, he can easily raise these animals in numbers sufficient to make the revenue from their pelts great enough to cover the cost of producing them; then the meat supply for the other animals would cost him nothing. Furthermore, he would have the advantage of furnishing rabbit meat for the market, as well as for his own table supply, thus realizing a profit from all angles of the enterprise. An additional revenue also may be had through sales from his herd of all fine specimens for breeding stock. There is a large demand for fine breeders at prices far in excess of the sale price of the pelt and the flesh combined.

Confronted with these advantages the installation of a rabbitry in connection with a fur ranch should be sufficiently appealing to justify its cost. Space that would otherwise be wasted may be utilized for rabbit raising.

Where the best of fur is to be expected, rabbits should have as much room for exercise as possible, preferably on the ground, where they should nest also. When they are to be sold for breeding stock or for market, they may be raised in small hutches 3'x4'x18 inches high, which may be tiered, one upon another, in any available space, and as high as they can be handled conveniently. But these hutches are not large enough to assist nature in developing the furs to the finer grade, to which end this article shall be directed. The domestic breed of rabbits should not be subjected to extremely low temperatures in outdoor enclosures without the adequate provision of warm, draftless dens.

Rabbit meat is in common use on the tables of thousands of families in some parts of the country where the

animals are raised extensively for food. So important is the product that it is given space in the papers along with other market quotations.

Where a rabbit raiser is in position to raise his own vegetation and grain it would seem that there could be no question of the possibilities for developing an enterprise well worth the time and effort devoted to it.

According to a report from the Biological Survey, U. S. G., about one hundred million rabbits are marketed annually in France for meat, about two million two hundred thousand in Belgium, and from thirty to forty million in England. There was shipped into Great Britain, through London, from Australia and New Zealand in 1910, \$4,500,000.00 worth of rabbit meat.

Some of our most learned authorities estimate that there are now about 50,000 persons raising rabbits in the United States alone, in which there is a valuation of around \$25,000,000.00 represented in the aggregate.

The many kinds of rabbits and hares that are now being raised in the United States and elsewhere have been so thoroughly domesticated that the process of raising, breeding, and feeding, and the general care of the one is about the same as for the other. While the kind to raise is merely a matter of fancy on the part of the raiser, it should be his direct effort to raise the rabbit that would produce the most valuable furs, such as an all-black, all-blue or all-grey. These solid colors are more easily dyed and command a better price than do others of mottled design.

The French silver, or Argent de Champagne, is a very beautiful animal of solid color. It is said to produce one

of the most valuable rabbit furs known to the trade; this animal is not as large as the Black Flemish, but it would probably be the better kind for the fur raiser to develop. However, the Chinchilla seems to be gaining considerable recognition as a fur-bearing rabbit. It is a newly developed species of rabbit with which I am not familiar, but it is well worth a full measure of consideration. The superior specimens of Chinchilla breeding stock bring fancy prices. The essentials to raising them would not be radically different from the requirements of any other rabbit.

SELECTING THE BREEDING STOCK

The greatest care should be exercised in selecting rabbits for breeding stock because there are so many unscrupulous dealers who neither raise nor have raised rabbits—merely brokers who simply have rabbits shipped from wherever they can get them at a low price, probably without ever seeing them.

The prospective rabbit raiser should select animals that are noticeably spry, active, quick-moving, with clear bright eyes; quick, erect ears that have no scabs in them to indicate canker. Beware of rabbits that sneeze or have mucous on their front feet, for these are the surest signs of colds, or snuffles. Long, coarse claws are indicative of old age. Long-jointed animals of any kind, especially females, usually prove to be producers of large litters, and are always better nursers. Straight tails and feet are also marks of quality.

An alert, observing purchaser should not overlook or disregard any of these qualifications, for each and every point carries with it a weight well worthy of consideration.

FEEDING

Rabbits should not be overfed. Give them only what they will clean up at each meal. They will eat almost anything in the form of grain or vegetation. Almost every rabbit raiser has a different system of feeding his animals, no one being much more successful than another; but in no event should rabbits be fed moldy or partly decayed, trashy food of any kind because these are productive of many ailments within the rabbitry, such as sore eyes, indigestion, inflammation of the stomach, etc.

Plenty of good clean clover or alfalfa hay should be kept in the rabbit enclosures at all times, the animals like to nibble on these at frequent intervals throughout the day and night.

A little oats, wheat, barley, or other available grain should be given to them each day, also a small amount of green food, such as carrots, rutabagas, dandelion, cauliflower, lettuce or lawn clippings. Care must be taken not to give them too much green food; for unless they have been accustomed to it each day they become too lax.

Cabbage leaves are not good for either old or young rabbits; it is just as well that these are never fed to them. Frozen vegetation, such as cabbage or potatoes, may cause death if they eat them.

When the weather is cold it is a good plan to give all does with young, a feed of warm mashed oats with milk, or bran with milk each day until the youngsters are weaned; this form of food assures to the mother a sufficient flow of milk with which to nourish her young. An observing attendant will experience no difficulty in

determining when his rabbits are getting enough food, yet, they are inveterate beggars.

When rabbits are being fed for market they will increase in weight much faster if they are given more of grain and less of greens, for in this respect they are much like pigs. If they are placed within small quarters where an abundance of good grain and fresh water are provided they will fatten quickly. In each hutch there should always be a lump of rock salt, which they can lick when their systems require it.

BREEDING

It is a common custom with some rabbit raisers to begin breeding the rabbits about February 15; the animals will bring litters ranging from three to twelve in number about thirty days later. The adults may be bred again when the young are about six or seven weeks old, and so on throughout the year, except when they are in molt, or shedding; the progeny of rabbits bred during the shedding season do not produce desirable furs.

The doe should be taken to the hutch of the buck at mating time; never take the buck to the doe because he would be nervous in new, strange quarters for a couple of days, during which time they might not mate.

Each doe and each buck breeder must be kept in separate hutches at all times, but the young of any or all families may run together until just before they become of breeding age, when the sexes must be separated.

All bucks should be kept where they cannot see a doe at any time until they are to be mated; then the result of breeding will be much better. Inbreeding should be avoided at all times.

The attendant to a rabbitry will soon recognize a con-

siderable advantage in breeding a number of does at the same time so that in the event one of them should bring an unusually large litter, they may be averaged by transferring some from the large litter to a smaller one; this can be done without fear of ill results because a mother will nurse the young of another as readily as she will nurse her own. By so averaging it will be an easy matter to arrange the litters so that each mother will be nourishing not more than six or seven youngsters at a time; a less number would be better.

Rabbits remain in breeding prime until they are about three and a half years old, but it will be noticed that the better results are obtained when they are between the ages of one and three years; after that age they should be supplanted by younger stock, to maintain the vigor and stamina of the herd.

It is better at all times to breed young does to old bucks, or vice versa, thereby greatly increasing the vigor of the progeny and building up the herd to one of supremacy.

Breeding-stock may be retained in the proportion of about ten does to each buck, but better results would probably be procured if each male associated with about six or eight does. The buck should not have the company of a doe oftener than about every second day. When a doe refuses his company she should be displaced immediately with another. An observing attendant can always determine when a doe is not in a receptive mood, by her persistent effort to escape the attentions of the buck by running from him, whining, and sometimes lying flat, refusing to rise. When it is certain that she is not receptive she should be removed to her own hutch for a few days, and returned to the buck at frequent

intervals until she is apparently mated; then she should be returned to him again within a week; if she tries to escape him this time, it is reasonably sure that she has mated.

Does should have warm, clean, dry nest-boxes that are free from drafts, in which to bring their young. Within about ten days of the time when the young are to be expected, the nest-box should be placed in her enclosure, with plenty of hay provided for her to make her own nest, which she prefers to do; she would not be contented with any designed by the attendant. After she has made the nest she should be given some scraps of rags and cotton with which to line it. However, she will give it an additional lining by pulling the fur out of her breast in sufficient quantity to cover the youngsters when they are born.

Beginning about three days before the young are expected, each doe should have a warm mash with milk each day, and be constantly supplied with an abundance of food and fresh water, because they become extremely feverish at this time when they seem to demand food and water almost constantly. If these desires are not adequately met they will sometimes destroy their own young. The mash with milk should be continued each day until about the time when the young are to be weaned, especially if the litters are large.

About the second day after the young are born, when the mother comes out for food she should be closed out long enough for the attendant to look inside of the nest to see if there are any dead ones, or to count them so that in the event there are too many for her to nurse he may remove some of them to a mother with few. But, the nest should not be looked into oftener than is abso-

lutely necessary until they are about a month old, because this would keep her nervous and she might resign her job, leaving the youngsters entirely to the keeper's care. In this event, they may be taught to drink milk from a pan by dipping their noses into it.

CARING FOR THE YOUNG

Young rabbits should not be fed too much hay, oats, grain, or other coarse dry food at weaning time, which is the crucial period in their lives. This change of diet sometimes gives them indigestion, from which they often develop what is known to rabbit raisers as "slobbers." Also, green food should be given sparingly, for the same reason. An occasional feed of dandelion is especially beneficial to young rabbits in the spring; in fact it is good for both young and old. Dried carrot tops, turnip tops or beet tops are always good for the growing young, and for the old as well.

Young rabbits, of the kinds mentioned here, are usually weaned at seven or eight weeks of age. They do not begin to shed the baby coat until they are about two months old; as they are about one month in shedding, it is really better that they remain with the mother until after that time.

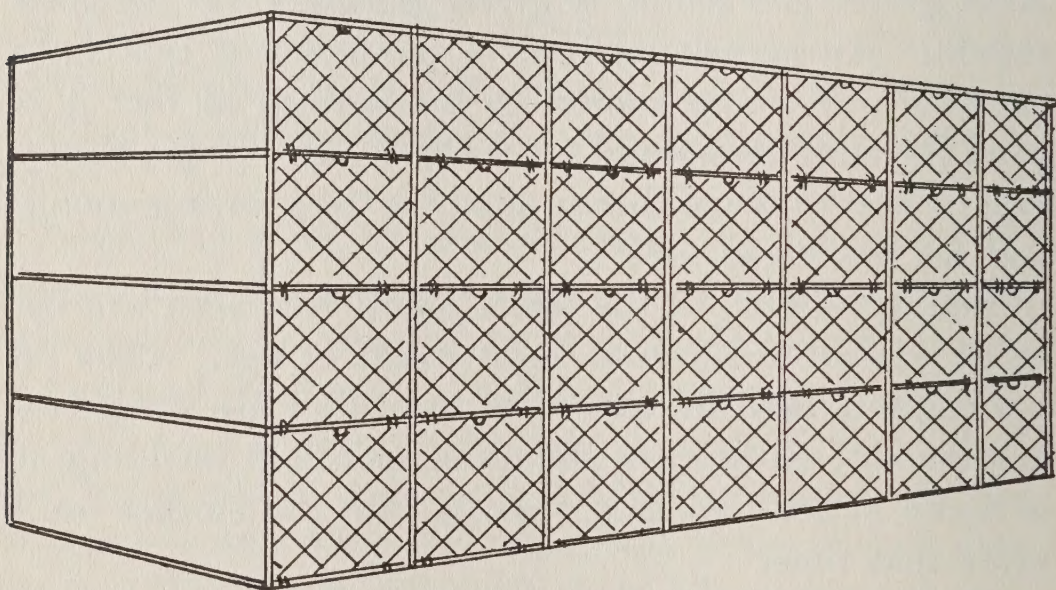
The period in which most young rabbits are lost, is from the weaning time until they are about four months old. If they are left with the mothers until this time, a less number of losses will result; however, very few raisers follow this practice because it would greatly lower the yearly production.

Irrespective of young rabbits, of the kinds mentioned here, reaching sexual maturity at about nine months of age, it is better that they are not permitted to breed

until they are ten months old. The French Silver would probably breed at about seven to eight months of age. The smaller varieties breed earlier, and oftener.

HUTCHES

There are probably as many designs for hutches as there are rabbit raisers in existence. Most of these designs were conceived in the inventive minds of the people who built them, each of whom would insist, perhaps, that his is the better kind because it is suited to his own idea of economy, convenience, and cleanliness. Analysis of



A conveniently arranged outdoor rabbitry. The meshwire ends should face southward to admit sunshine.

results obtained fail to disclose facts sufficient to support an opinion that any one plan of hutch construction is superior to that of another, if it is dry and draftless, and permits of a good circulation of fresh air. While a plan for constructing a practical outdoor rabbitry is shown in the accompanying illustration, the attendant's

ingenuity might enable him to conceive one more suitable to his own conditions.

In the event a rabbitry should be constructed along the lines of the illustration, a canvas roller or drop curtain should be provided to exclude the cold wind and moisture during inclement weather, especially if the rabbitry is to remain outdoors during winter months. The curtain may be lowered and raised as the conditions of the weather demand.

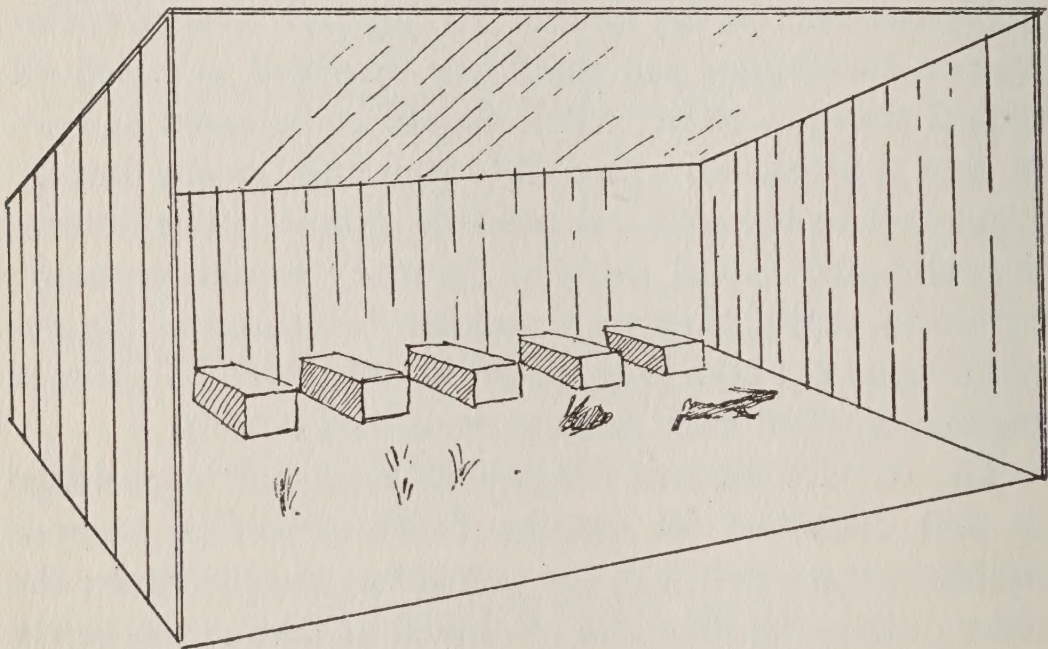
ENCLOSURES

Any kind of furs develop better if the animals that produce them have an open runway where they may exercise and nest on the earth. To this end, a large enclosure or developing pen should be provided in which all rabbits that are to be pelted should be released as soon as they are weaned, where their furs and frames may be developed to the greatest possible extent. The domesticated hutch raised rabbits, (adults) would probably not do so well if they were suddenly released in the developing pen where they would be subjected to outdoor exposures when they are not accustomed to it.

The developing pen for rabbits need not be so large as that described for skunks, foxes or minks, because rabbits are never left in the pen for as long periods; the older ones being disposed of almost as fast as the newly weaned ones are admitted. In the event any litters are born in the developing pen, the family should be transferred to a breeding hutch or to some individual enclosure as soon as they are discovered, because the bucks that are at liberty within the enclosure would kill the young rabbits if they should happen to enter the nest at some time when the mother is out hunting food. The

adults would also trample the young to death about the time they are old enough to run around outside the nest; therefore, all families must be retained in individual hutches or pens until the youngsters are weaned.

The fence for the developing pen should extend about eighteen inches underground, and stand about five or six feet above the surface, with a few strands of barbed wire around the top to prevent dogs from jumping over it, to annoyance and destruction of the rabbits within. The fence may be made of boards, stone, or about one inch mesh, eighteen gauge, galvanized wire. A wire fence should have a top turn-in, or overhang.



Shed adjoined to the north end of the developing field for newly weaned rabbits.

The entire enclosure should be heavily sown with clover or alfalfa, either of which rabbits eat liberally in both the green and dry state.

As shown in the illustration, there should be a shed running the full length of the enclosure, at the north

side, to provide shelter for the animals during hard rains and heavy snows. This shed may be built of waste lumber, which may be had at a low price. The spaces between boards should be stripped to prevent drafts, and the roof should be impervious to water. The nest-boxes should not have bottoms, and should set back under the shed to provide the animals protection from the elements. Our American wild rabbits would not occupy the shed.

Old boxes that may be procured at almost any retail store provide desirable nests in the developing pen if they are dry and draftless. In the event a box is too large for one rabbit, it may be partitioned off with a separate entrance to each compartment from different sides.

Inasmuch as all rabbits in the developing pen are to be pelted about the time they attain breeding age, the sexes may run together without fear of serious antagonism arising among them.

DISEASES OF RABBITS

SNUFFLES

Snuffles is unquestionably the disease mostly feared by rabbit raisers. It begins with a cold caused by drafts, and indicative by sneezing accompanied with a watery discharge from the nose; this discharge soon becomes white, and in the last stages of the disease it becomes yellow. As soon as a rabbit is found to be so infected, it should be pelted immediately and its flesh boiled so that it may be fed to the carnivorous animals of the ranch. Then its hutch and all other hutches in the colony must be cleansed and thoroughly disinfected to prevent the disease from spreading, for it is very contagious.

Treatment—If it is desired to save the animal, place it in a dry, well ventilated, sunny place, where it will not be subjected to sudden changes in the temperature. Dusty, moldy, or unclean food must be avoided; all vessels must be boiled after each feeding, and the hutch must be kept thoroughly sanitary; under these conditions the animal might recover within about ten days to two weeks. If it does not show improvement within that time, it would be advisable to pelt it and boil the flesh for animal food. After the attendant has treated animals with snuffles, he should disinfect his hands and remove the overalls, which he should wear at all times while attending diseased animals; these precautions are taken to avoid carrying the disease to others of the herd.

There are numerous “snuffle Cures” offered by rabbit supply dealers; some of these remedies might be helpful in checking the progress of the disease; I never have had occasion to use them.

SLOBBERS

Slobbers is probably next in order to be feared by rabbit raisers. But, with care and judicious feeding this disease seldom makes its appearance. If the youngsters get too much hay, grain or green food before they are thoroughly weaned, their stomachs are too delicate to digest it and they suffer indigestion, from which they almost invariably develop slobbers.

Symptoms—An excessive flow of saliva over the chin and throat.

Treatment—Wash the throat and chin with lukewarm water, and wipe away all external saliva; then rub finely ground salt all around the mouth and lips.

Or bathe the wet parts with a solution of boric acid; two or three applications of either remedy, daily, will cure the disease in a short time. With either treatment, the rabbit should not have anything to eat or drink for about twelve hours; then provide fresh water with a gradually increasing feed of milk with a warm mash of some kind. It may be fed rough food, gradually, until the stomach can digest it normally.

MANGE

Mange is a parasite that bores into the pores of the skin causing the hair to come out and scabs to form. If allowed to take its course, unattended, it will completely denude the animal. This parasite originates in unclean surroundings.

Treatment—Neighboring hairs should be cut from around the affected parts; which should then be washed with warm water and castile soap until the scabs are well softened; then apply an ointment made by mixing one part of sulphur with three parts of lard. This should be applied two or three times a day until the parts begin to fur out. The attendant should always wash his hands and rub them with the ointment after handling the animals, as a precaution against infection.

Another Good Remedy—After washing as above suggested, apply an ointment made of equal parts of oil of tar and warm lard mixed to the consistency of a salve. This should be applied about twice a week, or until the affected parts begin to fur out.

EAR CANKER

Ear canker is an infectious disease caused by one of the mange parasites. It responds to treatment very

quickly, but if it is neglected it will invariably prove fatal to the animal so affected.

Symptoms—The animal will hold its head to one side, shake its ears, and try to scratch inside of them with its hind feet.

Remedy—Soften the scabs with warm water and castile soap, then apply a solution of twenty parts of olive oil to one part of carbolic acid and apply by dropping the solution directly into the ear, and on the affected parts two or three times a day. A few days' treatment will suffice to effect a cure.

SORE EYES

Young rabbits are sometimes affected with sore eyes caused entirely by unclean and poorly ventilated hutches.

Remedy—Remove the adverse conditions. Wash the eyes with a piece of cotton dipped in a solution of boric acid. Young rabbits should be watched carefully; at the first appearance of pus the eyes should be treated with the solution. A few treatments will soon dispel the disease.

SORE HIND FEET

If rabbits are kept on hard, wooden floors, their feet should be examined once a week. If they show signs of soreness or of becoming bare, they should have attention immediately.

Remedy—Put them on clean, dry earth, saw dust or straw. Grease their feet daily with carbolated oil or with mutton tallow until cured.

SORE HOCKS

Sore hocks may be treated with a 1 per cent solution of cresol, camphorated oil or iodoform. The animal should be kept off hard wooden floors until cured. This treatment is very good for any sores or wounds.

WARBLES

Warbles sometimes occur in rabbits. This condition is caused by a fly. The warble resembles an ordinary, small grub worm, which occupies a position between the skin and the flesh. Its presence can be readily detected by a lump under the skin.

Remedy—Slightly enlarge the opening in the skin with a sharp knife, and pull the worms out with a small pair of forceps, then bathe the place with 1 per cent solution of cresol. One treatment is sufficient.

INTESTINAL TROUBLES

Intestinal troubles usually develop in young animals from radical changes in diet, or because they get too much green food when they are not accustomed to it, resulting in an infection of the digestive organs.

Remedy—Usually a change of diet will correct this disorder.

CONSTIPATION

Remedy—More green food; less dry food.

CONVULSIONS

Convulsions in young rabbits usually occur when they are about two or three months old, caused by an intestinal parasite originating from unclean surroundings.

Remedy—Inasmuch as medicines seem ineffective in fighting this disease, about the best cure is to immediately put the animal through the pelting process, and thoroughly disinfect all surroundings to prevent the disease from spreading; it is very contagious.

HANDLING RABBITS

Rabbits should always be lifted by grasping the loose skin directly over the shoulders, as shown in the illustration,



Rabbits should be lifted by the loose skin over their shoulders.

with fingers toward one side of the rabbit—never toward the head or tail. Never, never, attempt to lift a rabbit by the ears or by the feet; it is just as improper to handle a rabbit in that manner as it would be to so handle a child.

While the information on the Guinea Pig or Rabbit is drawn largely from my personal experience, I am greatly indebted to the Biological Survey, U. S. Government, for much of it.

RABBITS AND HARES

The belief prevalent among many that rabbits and hares are identical, is erroneous. However, they are of the same family, with the following distinction:

Rabbits build their nests in seclusion; that is, they burrow into loose earth or under logs, or enter hollow logs or stumps, in which they make the nests. There they bring their young, which are both hairless and blind from birth, until they are about ten days or perhaps two weeks old; warm weather opens their eyes somewhat earlier. The young range from three to twelve at a litter.

When leaving her young to go out in search of food, the mother rabbit will stop up the entrance to the nest with loose dirt, grass or leaves to exclude enemies; re-opening the burrow to enter, upon her return home. Rabbits trust to seclusion for protection.

Hares are larger than rabbits, have longer joints, longer legs, and very much longer ears. They make their nests and bring their young in open space on the surface of the earth—usually in a scanty bunch of grass. Their young, which seldom exceed three at a litter, are born fully furred, and with eyes open.

Young hares mature so very quickly that they are able to run and make their escape from enemies within a remarkably short time after birth. Hares trust to their fleetness for protection, never entering burrows or hollow logs; neither do they seek cover in brush piles or thickets. They remain absolutely in the open and “take to their heels” for escape.

However, some breeds of hares, that have been domesticated for generations, in the little hutches commonly used for them have learned, through necessity, to occupy a nest-box in which to bring their families.

The American hares, which are common to our far western prairies, are generally referred to as “Jack Rabbits,” a name probably given to them because

their extremely long ears so much resemble those of the male member of our well known western donkey family—the Jack.

When hares are chased by their enemies such as dogs, coyotes, or foxes, they always run on three feet only, that is, on their two hind feet and one front foot, holding the unemployed front foot in a position drawn up alongside the body. They run in this manner until the enemy begins to get too close to them, when they bring the unemployed foot into service, greatly increasing their speed. The rabbit runs on all four of its feet at all times.

THE MOLE

A number of persons have, recently, suggested an attempt to produce moles under domestic control.

While it is true that this little animal produces a wonderfully fine and most beautiful fur, I can not conceive any feasible manner in which moles could be raised profitably. These animals must live underground where they feed almost continuously upon worms and insects. It is said that they will die within four to six hours if they can not procure food.

THE LARGER ANIMALS

That the bear, deer, reindeer, wapiti, buffalo, elk and antelope may be successfully propagated, has long since been proved. From all available information it looks as if the deer or the reindeer, would offer the greater possibility for attractive returns on the investment, because of their semi-domestication.

I spent considerable time in years past among cattle ranches on the Great Plains of Texas and New Mexico, where antelopes existed in large numbers, at that time, and I gained sufficient personal experience with them to determine with reasonable assurance that antelopes will breed normally in captivity and that the young are as easily raised as calves.

While antelopes are extremely wild at first, they become domesticated as readily as do deer. The young, when captured, are peculiarly susceptible to kind treatment. They will submit to being fondled almost immediately upon finding that they are not to be harmed.

THE KARAKUL

The Karakul Sheep which was recently introduced into America from Bokhara, an Asiatic province near the Caspian Sea, is now gaining considerable recognition among all classes who are interested in animal or fur production.

The lambs of these animals produce pelts with remarkably handsome curly coats that are more akin to fur than to wool. These pelts, from which stylish, expensive, and extremely popular garments are made and worn the world over, are usually sold under the name of Karakul Fur, or Persian Lamb.

Karakuls thrive best on non-productive waste lands; develop normally in almost any climate, especially in high mountainous districts, and are not more expensive to raise than any other kind of sheep would be, but very much more profitable. With these conditions already established, and the essentials to sheep raising so well known throughout the land, it certainly looks as if raising these animals would appeal to anyone interested in outdoor enterprises.

Karakuls are now officially registered and pedigreed genealogically, enabling the ranchman to receive fancy prices for superior foundation specimens. The demand for fine breeding stock is growing rapidly, and will continue to grow for many generations.

Since these animals belong more to the stock-raising industry, which is a thing apart from fur-raising, they shall not be given detailed consideration here.

FUR RAISING IN THE SOUTH

To say that no southern climate is productive of high grade furs does not mean that fur-raising can not be profitably conducted in our southern states, for it surely looks as if it could be with some animals, under favorable conditions.

If the attempt should be made, it would seem that the Mink, Opossum, and Otter would be the ones to offer the greatest possibilities for profit, especially if they were ranched collectively. For instance, in the south the ranchman would have the advantage of being able to dispose of both the flesh and the fur of the opossum at good prices. Otters and Opossums are very fond of Minks' flesh, which would provide the greater part of their meat diet.

If the ranch is located where the attendant has a little space in which to raise the proper vegetation to feed rabbits, he would be able to reduce his cost of animal production to the minimum.

Otters, Minks, and Opossums are all native to southern climates where their furs will develop to practically the standard of normal; this is especially true of the otter, because of its aquatic habits, and of inland waters being of almost uniform temperature during winter months, in all parts of the world north of the thirty-fifth degree of latitude.

Of course such animals as Skunks, Muskrats, Coons, Foxes (especially the Silver Fox) and many other fur-bearing animals would, no doubt, produce much better furs in a more northern locality. While there are Skunks, Coons, and Muskrats in the southern states in

large numbers, their furs are much lighter in shade, and of lesser value than those procured farther north. Furs develop density according to requirements of the climate in which they are produced.

These conditions being not nearly so pronounced with Otters, Minks or Opossums, is the reason why these animals appear to be more feasible for southern production. The requirements for raising these animals in southern States would not differ from those of northern localities, all of which are explicit in the separate articles devoted to them.

DEVELOPING YOUNG ANIMALS

All young growing animals require considerable care in developing them into large-boned healthy subjects, for it is upon these specimens that the attendant's reputation will stand, and on which he can base his prices for foundation stock. This is, for the most part, accomplished through proper feeding and desirable dens. The large strong bones necessary to produce large stock do not always develop through feeding alone, and it is to this end that the attendant should specially direct his efforts.

All young, growing, animals need lime to give strength to their bones; for this purpose they should have plenty of fresh bones or joints of small animals on which to gnaw. They eat these small joints from which they get some of the needed lime. Chewing these bones is also beneficial to their teeth, in addition to this they should have some codfish oil or lime-water on their food each day, until weaned. The lime may be given as prescribed under the caption of "*Lime Water.*" Also, they should have all the exercise possible while they are growing.

ANIMAL BISCUITS

Mix about equal parts of wheat bran, carrots, ground alfalfa hay, yellow corn meal, fresh meat (with plenty of fat and cracklings if available), with a small amount of salt and baking powder. Pass this mixture through a meat grinder; then moisten it with enough codfish oil or molasses to make it adhere; then pour it into a bak-

ing pan forming a large pone about two inches thick, cut the pone into squares of about two inches each, and set it in the oven to bake slowly. When baked in squares it is more easily handled, and each square would represent an average meal for one animal. If these squares become hard and dry they should be softened with a little fresh milk, gravy, codfish oil, or molasses. The oil is especially beneficial to fur animals, and they like it. The molasses develops gloss on the furs; the animals will soon acquire a taste for the molasses, and will relish it.

All fur-animals like these biscuits, but they should not be fed for a constant diet. Animals, as well as man, must have a diversified ration.

About a two weeks' supply of these biscuits may be made at one baking and stored in a cool, dry place, where house rats cannot reach them.

CALORIC FOOD VALUES

Food	Calories Contained
1 pint milk.....	390
1 pound beef tripe.....	450
1 pound beef tripe fat	600
1 pound beef heart	450
1 pound beef shank	450
1 pound beef fat	650
1 pound beef liver	650
1 pound lamb heart	850
1 pound lamb liver	750
1 pound lamb liver slightly cooked	850
4 ounces rice	400
4 ounces whole wheat flour.....	400
4 ounces corn meal	400
4 ounces rolled oats	400
2 ounces cod liver oil.....	500
2 ounces beef suet	450
1 raw egg	65 to 75

CALORIC FOOD REQUISITES

Considering the Fox as a Basis

That young foxes or other fur-bearing animals may be successfully raised to the superior strain, it is essential that special attention be paid to the caloric value of their daily ration. It is the caloric value of food that supplies the unit of heat from which all animal life is sustained and from which the young attain their growth.

To make it possible for a mother fox to properly nourish her cubs she should be fed the equivalent of about 550 calories a day to sustain her own bodily strength and an additional 160 calories a day for each cub that she is nursing. This additional ration should be doubled at the beginning of the second week, tripled at the beginning of the third week and quadrupled at the beginning of the fourth week of the cubs' existence.

When the young foxes have their eyes open and begin to run outside of the nest at about four weeks of age, if they have been properly nourished they should weigh about fourteen or fifteen ounces each, or about 1¼ pounds at around five weeks of age; females weighing perhaps an ounce or so less than the males. If they are found to be underweight, increase the daily rations. All food should be diversified as much as is consistent with economy.

Quantities of the different kinds of food necessary to supply the requisite calories may be determined by the tabulation under the caption of "Caloric Food Values."

If these requirements are fulfilled there will be no scrubby stock and no losses of young animals on the ranch from deficient food requisites.

The number of calories in meat are increased by its

fat contents. When the cubs are weaned their daily ration should be increased until at the age of nine months each cub should be getting at least 410 calories a day; ten months old, 450 calories; eleven months old, 490 calories, twelve months old, or at maturity, 530 calories.

Considering the fox as a basis, all mother animals should have food, during the period of lactation, in proportion to the comparative size of their kind, as follows:

Raccoons, opossums, and fishers should be fed about the same number of calories for the mother and her young, as would be given to foxes. Skunks, minks, and martens would require about two thirds as much as foxes.

The same graduating scale of weekly increase as the young grow older would apply to any of these animals proportionately, as it does to the fox. To obtain the maximum in caloric food values all cereals should be cooked in mutton or bone-broth for five or six hours, in a double cooker, or it should be steamed to prevent scorching.

If the animals are raised to the superior strain, which should be the aim of the attendant, he can not, in the early stages, neglect the essentials to that end and expect the animals to present the "paragon" at maturity.

LIME-WATER

Lime-water is given to young growing animals for the purpose of building big strong bones within themselves to make superior specimens possible, and to prevent "rickets" or weak joints. Rickets often develop

in animals raised in captivity, because of their inability to get joints of other animals to eat, which supply the needed lime.

To Make Lime-Water—Put a large doublehandful of unslaked lime into about two gallons of water; let this stand about forty-eight hours; then draw off all water until the settling at the bottom begins to make the water milky; refill with about a gallon of water; let this stand another forty-eight hours; then draw off as before. These mixtures make nearly three gallons of lime-water, which should be kept in jugs for use as needed. The settling that remains is an excellent disinfectant.

This lime-water should be given with the food, or in the milk that is fed to all prospective mothers, and to all young growing animals so they will get it in the proportion of about one-half teaspoonful each day, for each animal, gradually increasing the allowance to one teaspoonful for each animal until they are weaned.

This same remedy is put up by chemists, usually under the name of "Phosphate of Lime," but under that name it is *much more expensive*, because of the chemists' liberal charges for concocting it.

DEVELOPING THE FUR

That furs superior to any from the wilds can be developed on the ranch has been proved beyond question. Yet many fur raisers, through carelessness or through inattention to the essentials, do not get the best results.

To produce good results the animals must nest on the ground, to enhance the quality of their furs through contact with the electricity in the earth, and through the

absorption of a certain degree of moisture that arises from it.

All animals must have clean, fresh food, with pure fresh water if the best results are hoped for.

Carrots fed liberally to muskrats or to almost any other animal for ten days, will greatly improve the luster of the furs and enhance the value of it. Flaxseed fed to any animal will contribute largely to the life and lustre of its fur. These may be given in ground meat of any kind that is being fed to the animals, or they may be ground up with wheat, carrots or oats if fed to muskrats or rabbits. Each animal should get about a teaspoonful twice a week for about two weeks.

One egg daily or a little molasses, for a period of one week, will bring out the lustre, and add wonderfully to the richness of the fur of any carnivorous animal.

All animals should have as much exercise as possible, in large enclosures, to increase the density of their furs.

Underfed or poorly nourished animals do not produce good furs. In fact, if they are not properly fed, their furs will not prime at any time during the winter. Yet they should not be too fat at killing time. Simply keep them in a good, healthy condition—use judgment.

Those fed on dead animal-flesh or putrid meat of any kind, will not develop good glossy furs.

Animals infested with vermin will not develop good furs; neither will those troubled with intestinal worms. These conditions have a tendency to lower the vitality to such an extent that nature can not do its part in development.

When furs are not prime they lay down close to the animal's body. As they commence to prime they begin to raise up until when fully prime they stand practically

straight out from the animal in a decidedly fluffy fashion.

WHEN FURS PRIME

The dates mentioned here are with reference to the northern tier of the United States, or between forty and fifty degrees of latitude. A few weeks earlier may be considered for more northern districts, or a few weeks later for the central section, or south of forty degrees.

Skunks begin to prime about November 1. They begin to depreciate about February 1, just prior to the breeding season.

Minks prime about December 1, they are usually at their best about January 1, and begin to depreciate about February 15.

Muskrats do not become prime until after the semi-hibernating period, or until they begin to "run" at the break of winter, usually March 1. They begin to depreciate about April 1. If the best muskrat pelts are to be expected, they should be taken between the first and fifteenth of March. A perfectly prime muskrat pelt rarely ever reaches the market, from the wilds, because laws prohibiting the animals being trapped in early spring go into effect before these furs prime, and these laws are now rigidly enforced in nearly all states to protect the animals at breeding season.

Beavers do not prime until the break of winter, or about March 1. They begin to depreciate about April 1.

Opossums prime about November 15, and begin to depreciate about April 1.

Raccoons prime about December 1. They begin to depreciate about March 15.

Foxes are prime about December 15, and begin to depreciate about March 1. The best silver effect on black foxes is only of short duration during mid-winter.

Martens and fishers are prime about November 1, and begin to depreciate about March 15.

The furs of nearly all animals except that of the beaver and the muskrat are at their best, in all climates, around January 1.

From the foregoing, the reasons why trappers never get a high average for their yearly catch of furs, is obvious. That they may avoid the rush while the animals are still plentiful, they begin trapping far too early in the season, and continue entirely too late.

MARKING FUR ANIMALS

Nearly all fur-bearing animals have five claws on each foot; the attendant may, with a pair of pincers, clip off a portion of the claw of any toe on any foot. Each clipped claw may indicate whatever the attendant wishes. For instance—the first claw of the left hind foot would indicate related stock; it would also show the parentage of all other animals so marked. The margin for marking in this way is so broad that almost an endless record may be kept. The ranchman must work out his own system of marking, keeping card records, etc. so that he will not become confused.

Some fox raisers use a tattooing ink with which to inject a private mark into the animals' skin, enabling them to recognize a fox or its pelt, in case of theft. Rabbit raisers usually tattoo in the ears of the animals.

When fur-bearing animals are raised in large numbers, all breeding pens should be numbered systema-

tically, to assist in handling them intelligently. For instance—if all related females are kept in pens bearing even numbers, and males not related to them were retained in pens with corresponding numbers, the breeding routine would be easily conducted without danger of inbreeding.

Whether or not the pens are numbered, the system of clipping the claws should be in effect; otherwise, if superior breeding specimens should develop in the general enclosure, just before pelting time, it would be almost impossible to determine their parentage, and inbreeding would likely follow; then an otherwise superior strain of animals would deteriorate.

A special mark also should indicate the year in which the animal was born, and its sex.

KILLING FUR ANIMALS

All fur-bearing animals are easily and painlessly killed by an anaesthetic. An air-tight box should be made for this purpose as described under the caption of "*Killing Box*." Place the animals inside of this box in numbers as desired, then, close the door as tightly as possible. Pour a small quantity of chloroform or carbon bisulphide on a piece of cotton and insert it through a small hole in the top of the box; then cork the hole tightly.

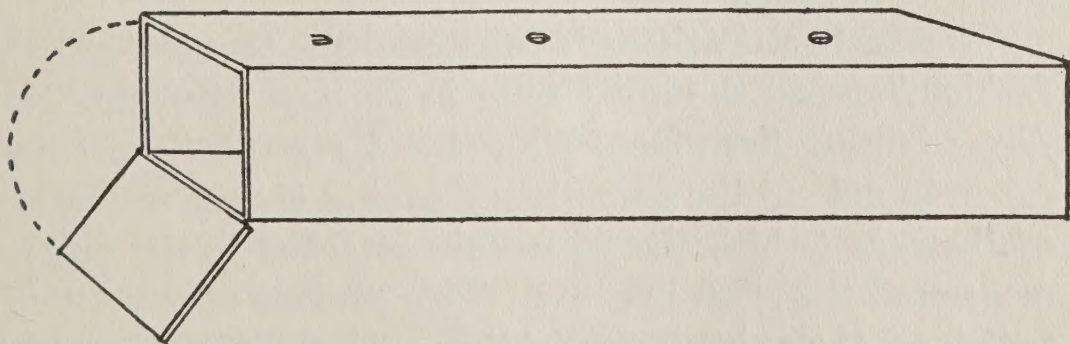
The size of the box and the number of animals within it would determine the quantity of liquid necessary to dispatch them. Five or six teaspoonfuls would be enough to kill six or eight animals, unless there is considerable vacant space in the box. They die very quickly without pain or struggle.

They may also be killed with illuminating gas; the gas is admitted through a small hole in the box by means of a small rubber tubing of sufficient length to reach from a gas jet to the box; if there is some space remaining where the tubing is inserted in the box, it may be closed by packing cotton around it.

Any animal that is to be pelted should be spirited away from the others and kept completely out of their sight and smell; otherwise, they will know what is being done and become nervous, probably with detrimental effect at breeding time.

KILLING-BOX

The killing-box should be so constructed that it will be absolutely "airtight" when closed. The box should be about twelve by twelve inches, and as long as the requirements demand, according to the number to be killed. It should have a padded door at the entrance so the box will be "airtight" when closed. When the animals are driven into this box the door must be closed tightly; then the anaesthetic must be applied through the cork-holes in the top, which must be corked tightly, at once, to prevent the fumes from escaping.



The Killing Box, in which animals may be dispatched without pain or struggle, by the anaesthetic method.

This kills the animals within ten to fifteen minutes, without pain or struggle, but it is better to allow them to remain in the box for at least thirty minutes. The anaesthetic does not damage the fur in any way. Skinning should not be attempted until the carcasses become cold, but it must be done before they freeze, otherwise, the pelts will be difficult to remove in good condition.

SKINNING AND CURING

Otters, Minks, Martens and Fishers

Although the method employed in skinning fur-bearing animals is quite generally known, an orderly procedure is given here for the information of persons unfamiliar with the process.

Begin by cutting the skin around the ankle of each hind foot. Then slit the skin down the underside of one hind leg to the base of the tail, and around the underside of it; then up the underside of the other hind leg to the point on the ankle where the skin was first cut. Slit the skin of the tail at the underside, to the end of it, so that the tail-bone may be removed entirely, because if any part of it remains, it will putrefy, causing the tip-end tail hairs to fall out, greatly depreciating the sale price of the pelt.

Proceed to strip the pelt down over the carcass "glove fashion," using the knife only in cutting ligaments to free adhering flesh from the pelt. Great care must be taken to not cut the pelt when skinning around the base of the ears (which should remain attached to the pelt) or around the eyes, lips, etc. This process removes the pelt from the animals "cased," or with the fur side in—as all fur buyers prefer to receive them.

The pelt is now ready to be adjusted to the stretcher, over which it should be stretched only enough to prevent shrinking and wrinkling while it is drying. All adhering particles of flesh and fat must now be removed from the pelt by means of a dull edged instrument such as a rasp, dull hatchet, or fleshing horn. The pelt should now be hung in a dry, cold, shady place, where there is a good circulation of fresh air to cause it to dry as quickly as possible, but not permitted to freeze.

The tail-slit may be held open with a few wooden slivers adjusted horizontally across the skin from edge to edge so the interior will dry quickly. A small amount of common table salt should be pushed down into the pocket formed by extracting the tip-end of the tail-bone, in order to prevent possible decomposition, for this part would be difficult to expose to the air sufficiently to cause it to dry quickly. When the pelts are thoroughly dry they are ready to be shipped to the commission house for sale.

These pelts will sometimes command better prices if they have the animal's claws remaining attached to them. When it is desired to sell them in this form, instead of cutting the skin around the ankles, the palms of the feet should be skinned out to the intersection of the claws, where they should be severed from the inside, at the last joint, and left attached to the pelt. Then a little salt should be sprinkled into the foot pocket to prevent decomposition, otherwise, the claws would soon drop off.

No attempt should be made to remove the pelt from any animal until the body-heat has left it. It is then much easier to free it from adhering tendons or ligaments, and there is a great deal less danger of damaging

the pelt by cutting it, or by staining it with blood. Also particles of flesh and fatty substances are not so persistent in adhering to a pelt when it is cold; but if the carcass is permitted to freeze before it is skinned, the pelt will be quite difficult to remove, even after it is thawed out. Wait until the carcass is cold, but skin it before it freezes.

CURING PELTS IN GENERAL

All fox pelts should be cured "cased"—that is, with the flesh side out, but when nearly dry they should be turned with the fur side out and thoroughly dried in that manner. When packing them for shipment, the fur side being out, care must be taken to pack them so that the fur will not become damaged by coming in contact with the flesh side of other pelts, a part of which is always exposed.

Raccoons and beavers should be skinned "open"—that is, slit down the belly and flayed, as in skinning a cow. All pelts should be packed in pairs with the flesh sides together and so bundled that the furs will not suffer any damage from grease spots by coming in contact with the flesh sides.

Muskrat, Skunk, Mink, Opossum, Rabbit, Otter, Fisher and Marten pelts should be taken off, cured, and shipped "cased"—that is, with the fur side in. Fur buyers can readily determine the quality of a pelt from the appearance of the flesh side of it.

No pelt should be stretched more than is necessary to prevent it from shrinking and wrinkling while drying. If pelts shrink they are classed as thick, or boardy skins, and never bring the top price; yet, if over-

stretched they appear to be immatures or poorly-furred pelts and will sell at a considerably lower price.

As soon as pelts are adjusted to the stretchers, all adhering flesh and fat should be scraped off, then they should be hung in the desiccating room or shed in a cold place where there is a good circulation of air so they will dry quickly; they should never hang near a fire nor in the sun; nor should they be smoked. Preparations such as alum or salt, should never be used in curing pelts.

In curing the pelt of any fur-bearing animal the nose should never be stretched more than is necessary to prevent wrinkling; the elongated nose being indicative of southern stock, the fur buyer would probably class it as such, and a low offer would be the result.

When harvesting the fur crop the animals that bear them should never be drowned—it injures the fur; the use of an anaesthetic, as described under the caption of "*Killing Fur Animals*" is preferable.

STRETCHERS

For Curing Pelts

Stretchers may be made of $\frac{3}{8}$ " boards, with the small ends well rounded. All edges should be thoroughly sandpapered to prevent tearing the fur while inserting or extracting the stretchers.

The dimensions given here for making stretchers will meet the needs for the average sized animals but they may not do in all cases, because fur animals of a corresponding kind vary in size according to the locality in which they are raised and in proportion to the care

and attention given them by the attendant who raised them.

Judgment must be used in proportioning the size of the stretchers and in shaping them so that when the pelts are dried for shipment, they will be shaped to their natural proportions as nearly as possible.

This does not apply to raccoon and beaver pelts, because these animals are skinned "open." Their pelts should be stretched as nearly square as possible, without over-stretching them.

The extra length of these stretchers will permit of pelts being adjusted to meet slight variations in size which always come with the male and female, making it unnecessary to have numerous sizes for each kind of animal.

They may also be made adjustable by means of the wedge insertion, as shown for fox pelts; in this case they need not be so long.

After pelts of any kind are properly adjusted to the stretchers, a few tacks should be used to hold them in place so they can neither shrink nor wrinkle while drying. Tacks should be used only at the extreme edges of the pelts.

Wire stretchers will permit of some air reaching the fur side of pelts while they are drying; for this reason they are preferable, and as they will last indefinitely, they are cheaper. The springing sides make them adjustable to any size in pelts of a kind. The wide end of wire stretchers may be regulated to fit the pelt by means of a small piece of board with nails driven into it to about one-half their length, over which the stretcher-wire may be hooked to adjust it to the width of the pelt. The small end of the pelt is held in place, automatically,

by the expanding sides of the stretcher, but the wide end of it should be tacked to the wooden adjuster to prevent it from drawing or contracting during the drying process.

Stretchers for muskrats, martens, skunks, fishers, otters or opossums may be of the same pattern; the dimensions must vary according to the kind of pelts for which the stretchers are to be used.

DIMENSIONS

Otters, length 50 inches, width at wide end 8 inches, narrow end $5\frac{1}{2}$ inches.

Fishers, length 50 inches, width at wide end 8 inches, narrow end $5\frac{1}{2}$ inches.

Martens, length 25 inches, width at wide end $4\frac{1}{2}$ inches, narrow end $3\frac{1}{2}$ inches.

Opossums, length 30 inches, width at wide end $7\frac{1}{2}$ inches, narrow end $5\frac{1}{2}$ inches.

Skunks, length 25 inches, width at wide end 8 inches, narrow end $5\frac{1}{2}$ inches.

Minks, length 36 inches, width at wide end $5\frac{1}{2}$ inches, narrow end 3 inches.

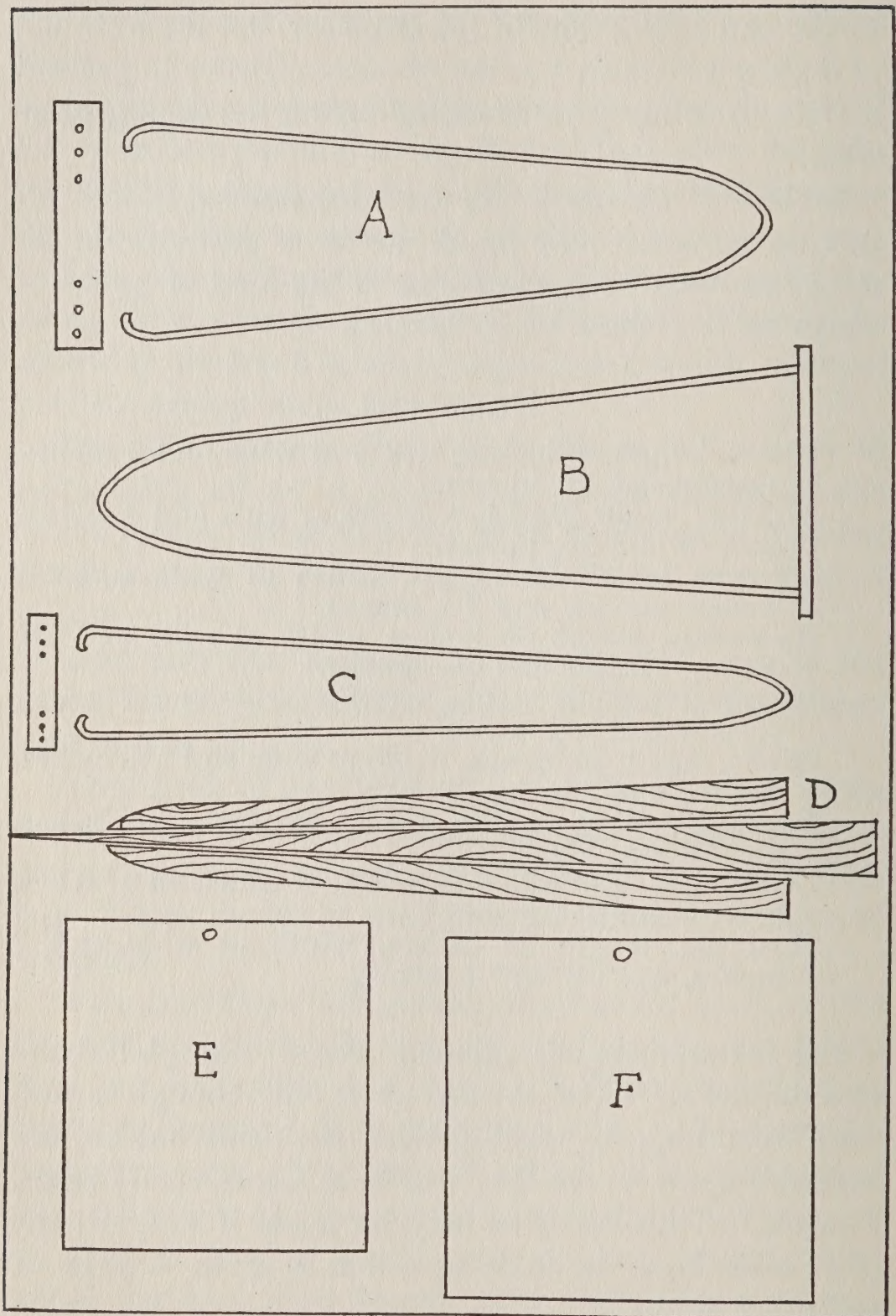
Foxes, length 50 inches, width at wide end 8 inches, narrow end 5 inches.

Ermines, length 12 inches, width at wide end 3 inches, narrow end $1\frac{1}{4}$ inches.

Muskrats, length 20 inches, width at wide end 7 inches, narrow end 5 inches.

All fur-animals are skinned "cased" except beavers and raccoons. These are stretched only enough to prevent wrinkling, by tacking them flesh-side out on any available space where they will be in a cool, shady place. Boards for this purpose may be made if desired; the pelts must have the same care that is given to pelts of any other kind.

At about two inches up from the small end, all stretchers should bulge slightly outward to fill in the



Designs and kinds of stretchers for the different animals. *A* and *B*—wire and wooden adjustables for muskrats, martens and skunks. *C* and *D*—for foxes, minks, fishers, martens and ermines. *E*—raccoons. *F*—beavers. Raw fur buyers and dealers in trappers supplies have all kinds of stretchers for sale; their catalogues are sent free on application.

quickly increasing pelt width at the shoulders. The first two inches should fill out the neck of the pelt.

The accompanying illustrations show the shapes into which the stretchers should be made; the width and length must be governed by the requirements necessary for each of the different kinds of pelts.

CURING AND DRESSING PELTS WITH THE FUR ON

There are many methods and recipes for tanning and dressing pelts,—one being, perhaps, as good as another if the proper labor is applied to it. A well known and very simple recipe for dressing pelts with the fur on, is the following liquid solution, which seems to be about as good as any:

Mix one-half gallon of common table salt with two gallons of water, and stir until the salt is well dissolved; add one ounce of sulphuric acid to this brine and stir well. Soak the furs in this solution for one and one-half to two days,—a little longer would do no harm. Rabbit furs, however, should remain in this solution for about four days.

Remove the pelts from this liquid and wash them several times in tepid, soapy water; then wring them as dry as possible and rub the flesh side with a bar of hard soap until the skin is well coated with it.

Then fold the skins in the middle, lengthwise, with the flesh side in; hang them in a cool, dry, shady place, over a cord, or rope until the flesh side is nearly dry, then lay them over a smooth board and with a blunt-edged tool, scrape the flesh side until the inner layer next to the skin is completely removed, when the skin will

become nearly white in color. Then stretch them, rub them and twist them until they are thoroughly dry. The more they are worked the softer they will become. If desirable furs are to be expected the pelts *must be soft*.

If after working them until they are dry, they do not seem soft enough, rub fresh butter into them thoroughly from the flesh side, then subject them to another course of rubbing, as before, working the butter out again by rubbing the flesh side heavily with coarse corn meal or fine sawdust. The meal or sawdust takes up all the grease that might remain on the pelts, leaving them perfectly soft and pliable, so they may be made into the desired articles.

Large fur-dressing houses have machinery that is employed in the rubbing process, through which all pelts undergo about eight hours of constant rubbing or tramping. This rubbing produces the flexible pelts that are more suitable for manufacture. The individual at home can always get a satisfactory result, with a little labor.

A quick bath in gasoline also softens the pelts wonderfully; at the same time it cleanses the furs without harm to them unless they are left in it too long.

The tanning solution *must not* be kept in a metal container of any kind, because the acid will corrode it, injuring both the vessel and the furs. It should be kept in either wooden or earthen vessels.

While several other formulas for dressing furs are in use, the foregoing seems to answer all purposes and is less complicated than the others. About the same amount of rubbing would be necessary in using any formula.

To soften pelts effectively, place them flesh side down-

ward on a one-inch plank, and (as in shining shoes) draw them quickly to and fro across the edge of the plank.

Another good method, especially for beaver and raccoon pelts, is to mix one-half gallon of oatmeal with one pound of salt and a pound of powdered alum, then stir in enough water to the consistency of mortar. After the pelts are stretched and fleshed as already described, spread a coating of this mortar on the flesh side of them, about one inch thick, and let them stand for four or five days; remove the coating and rub the pelts until they are soft. This process is too cumbersome for pelts of smaller animals that would be handled in greater numbers; but it is equally efficacious.

TO MAKE SCENT BAIT

(For Luring Fur-Bearing Animals to Traps or Pens)

Fish oil—for foxes, minks, skunks, opossums, fishers, otters, muskrats and coons.

Cut the fish into small particles, put it into a glass jar, and cork it. Let this stand in the sun for several days until the oil comes well out of the flesh, then draw the oil off into a bottle, mix with it a little musk, stir well, and cork it tightly. Then keep it in a cool, shady place for use when wanted.

This scent is especially attractive when used along streams or around the edges of lakes or marshes. Foxes or minks would be suspicious of fish odor, if they should encounter it away from water.

Another effective scent for practically all fur animals is made by mixing tallow or mutton suet with strained honey to the consistency of a thick dough, flavored with

oil of lavender. Roll into balls about the size of an ordinary marble. Put them in a glass jar well corked and keep in a cold place.

For luring foxes or minks to places away from water, the oils of birds, rabbits or chickens, procured in the same manner as described for making fish oil make effective scents.

A few drops of anise oil, or the musk of muskrats is extremely luring to the kinds of animals mentioned in the foregoing paragraphs whether they are water or land animals. The anise oil may be procured at almost any drug store. The musk of muskrats must be taken from the gland of the muskrat, bottled and corked. It is unlikely that it will be found in the average drug store, yet, there is a good market for it, and at an attractive price.

ODOR ON PELTS

Strong odor, or musk, which sometimes remains on pelts of the musteline family may be removed by first soaking the pelts in gasoline for about an hour; then wash them in the gasoline and wring them out thoroughly. If the first operation does not remove the odor entirely, repeat it.

If the odor is especially strong, as in the case of skunks, the pelts should be washed in a solution of one pint of formaldehyde mixed with one gallon of water.

BLOOD STAINS

Blood stains on furs may be removed effectively by means of a quick bath in gasoline. This also softens the pelts wonderfully.

✓ GRADING PELTS

Pelts that are bloodstained, cut in skinning, bullet riddled, torn, mutilated by the trap, improperly stretched, improperly cured, pelts that have remained on the animals too long before removing, or pelts from animals that were drowned and remained in the water all night, cannot be expected to bring the top prices; neither will they grade "A 1."

Pelts that are prominently vein streaked on the flesh side indicate poor quality and an immature condition—the result of malnutrition. Pelts taken before they are prime are indicated by a dull blue streak down the back, which is plainly visible from the flesh side. Pelts taken after the prime season has passed are thick, with an almost uniformly bluish cast; whereas, when they are prime they present a cleaner, healthier, and more translucent effect that is comparatively uniform over the entire flesh side, and have a much thinner skin, upon which the furs stand out full and fluffy. These conditions will be plainly discernible after the first season's experience in curing pelts on a fur ranch.

KEEPING FURS AND PELTS

All furs that are kept over during warm weather should be placed in cold storage, or in some dark, cool place. This not only prolongs the life of the furs, but it is instrumental in keeping moths from them. Moths are very destructive to furs of any kind.

CLEANSING, OR REFRESHING FURS

Any soiled fur may be greatly refreshed by rubbing flaked naphthalene well into all parts of it, then thoroughly shaking it out again. This makes the furs look as bright, and fresh, as they were when new.

DISEASES OF FUR-BEARING ANIMALS AND THE REMEDIES

Because so many diseases are mentioned here, it should not leave an impression with the prospective ranchman that fur animals are frequently, or continually infected with one or the other of these ailments, for they are not! The causes and remedies are given purely for the attendant's information and assistance in combating infection which might develop. Since we never know what the future may bring forth, "Prepare while all is well."

Complete Sanitation Is the First Treatment in All Cases.

SORES AND WOUNDS

Sores and wounds of all kinds may be treated with a one per cent solution of cresol or with camphorated oil. Unless wounds are severe they will usually heal of their own accord.

SORE FEET

Sore feet are caused, usually, by unclean dens. However, animals' feet sometimes become sore (especially animals that were brought in from the wilds) because they are continually climbing the wire fencing in an effort to escape. Or, if there is much gravel around near the intersection of the fence with the earth, their feet will become sore from continually running over it. It is the nature of all wild animals to run, at all times, nearest the fence that confines them.

Treatment—Remove the cause; put dry, clean earth, hay or sawdust where they run; grease their feet daily with mutton tallow or with carbolated oil. If the animals are kept where they cannot be conveniently handled, the remedy should be placed in some shallow vessel where they will step into it. The mutton tallow is far more effective if they are allowed to step into it when it is warm, for it will immediately congeal and stick to the bottoms of their feet long enough to permit of effective results.

SORE EYES

Sore eyes come either from unclean, poorly ventilated dens, or from feeding the animals spoiled food.

Treatment—Remove the offending conditions; wash or spray their eyes daily with a solution of boric acid. At the first appearance of pus, the eyes of the animals should be treated at once.

A few treatments will soon dispel the trouble.

MANGE ON ANIMALS

Mange is caused by parasites which bore into the pores of the skin, causing the fur to come out and scabs to form. These parasites come wholly from damp, foul, unclean nests. Mange is extremely harmful to the health of the animals, as well as denuding them of their furs if the cause is not removed. At the first appearance of this disease the animals should be treated attentively.

Treatment—Remove the cause; then, apply daily a mixture of one part sulphur with three parts of lard, well mixed. Or a mixture of equal parts of oil of tar and lard, applied daily. Either remedy should be applied warm, if possible. If the animals are where it is

difficult to handle them for this treatment, they should be immersed, completely, in the Dip Solution daily, or sprayed with it twice a day until all infected parts fur out. The solution will not damage their furs, nor will they swallow it.

If at any time animals are handled by the attendant, the hands should be rubbed over thoroughly with the remedy before and after handling them; mange is an infectious disease, and the hands might also become infected with it; furthermore, it would be an easy matter to transmit the infection to other animals of the herd. Any other "tried and proved" mange cure that might be more conveniently applied would probably be as effective as the ones referred to in this article.

PNEUMONIA IN ANIMALS

Pneumonia is the one thing to be mostly feared if it should appear among fur-bearing animals. It develops usually from drafts and in cold, damp, poorly bedded dens. Fortunately pneumonia is not of frequent occurrence. The first thing to do is to remove the cause, and see that the animals are properly nested. Then, a hypodermic injection of oil of camphor should be given in the hind leg on the underside, just above the hock. The amount to be injected should be governed by the size of the animal to be treated. Using the fox or raccoon as a basis for size, about one-half teaspoonful of the oil would be sufficient. At the evening meal they should be given a fair amount of castor oil on chopped meat, such as rabbit or chicken. But, if they are very sick they will refuse to eat; then, they should be caught, and by prying the mouth open with the use of the thumb and forefinger, they should be made to swallow an ordinary

capsule of the oil. In all probability they will recover within a few days after this treatment.

The keeper will know when the animals have pneumonia by their reeling walk, slow movements, and refusal to eat. Their convalescence is ascertained in the return of activity and appetite.

LAXATION

Laxation is of frequent occurrence with animals of any kind where indiscreet feeding is permitted, or where unclean environments prevail; it is dangerous if not properly attended. From twenty-four to forty-eight hours of fasting will usually cure this disease in any animal of the fur-bearing kind. In cases where this treatment does not suffice, they should be fed each day, sparingly, with fresh lean meat containing about five grains of Sayol, until all signs of the disease disappear.

TONIC

An old spike or large nail, thrown in the drinking vessel, provides an excellent tonic for all scrawny, physically weak animals; the iron from the nail makes the tonic.

BLOOD PURIFIER

A little common sulphur sprinkled over the food each day, for about ten days, will purify the blood. This remedy should be administered in late spring, before the young are weaned, because, while the sulphur purifies the blood, it also thins it, which is beneficial to the animals when hot weather comes on; but, thick blood is required as the winter approaches.

A GENERAL DISINFECTANT

Any good disinfectant, for sale at drugstores, mixed as directed on the container will meet all requirements for general use on the fur ranch. It should be used often and liberally in all breeding pens, nests, dens, and around all places where the animals frequent. This disinfecting destroys disease germs that propagate in filth, and find their way to the animals, causing infection.

TICKS ON ANIMALS

A drop of gasoline or the dip will kill a tick on any animal. However, the prevalence of ticks on the ranch is rare.

DIP SOLUTION

Use any good animal dip procurable at any drug store and mix as instructed on the container, which is usually about seventy parts water, to one part fluid.

A two per cent solution of Lysol makes a good dip for both vermin and mange. All animals are inclined to keep their heads above water while swimming in the dip, but they should be completely immersed three or four times during the five minutes that they must remain in the liquid solution. A tub or barrel is very good to use for this purpose; the animals can climb out of a bucket too easily.

Two or three dippings, about ten days apart, are always necessary, because the first dip will not kill all the nits. If the weather is cool the dipping should be done in a warm room where the animals must remain until

thoroughly dry, otherwise, if colds should develop, pneumonia might follow.

Where animals are difficult to handle, fluid applications may be administered by the use of a spray or small water-gun. There is always a time when the animal will be in such position that the application can be so made.

BORIC ACID SOLUTION

Boil about a pint of water; when it cools off to a little more than lukewarm put in as much boric acid powder as the water will dissolve, which is about the amount that comes in the regulation package. Pour off the water from the settling and bottle it.

The solution cannot be made too strong, because the water will not dissolve the powder beyond the desired strength.

This solution is good for sore eyes of all animals. It is more beneficial if it is applied warm.

VERMIN ON ANIMALS

Any animal might become infested with vermin. When this occurs, if the animals are immersed in the dip solution three or four times, at intervals of about ten days, they will be entirely free of all parasites. They should be dipped again two or three times during summer, it is good for the furs, and harmless to the animals.

Another good remedy for ridding fur-animals of vermin, is by the use of an insecticide, which comes in powder form and should be blown into their furs with a small hand bellows. These powders may be obtained at almost any drug store, one kind is probably as good as another. Vermin usually segregate themselves around the neck of the animal, and immediately above the base

of its tail, but, to some extent, they will occupy any place on the animal's skin.

Finely cut tobacco stems sprinkled around over the breeding pens, and in the dens, will completely rid the place of vermin, but it is not known whether or not these will have an adverse effect upon the animals; the stems may be procured, free, at almost any tobacco shop.

Remember, it is fully as necessary to treat the dens as it is to treat the animals. There is wasted energy in an incomplete job of any kind.

GENERAL SANITATION

All nests and dens must be kept clean. They must be disinfected frequently in every part of the inside and outside, as well as all around on the ground where the nests set. Breeding pens should be sprinkled all over with the dip solution, and especially well into the corners, for the animals mostly frequent the corners of pens.

Lime is used by many for disinfecting purposes, and it is very effective, but very likely it would have a tendency to burn the furs unless it is covered over with an inch or more of fresh dirt. For that reason it might not be advisable to use it, although, there is nothing better for general outdoor disinfecting than lime.

A ten per cent solution of Lysol is a good disinfectant for all purposes, but it is probably a little more expensive than the lime would be.

The morning is always the better time for disinfecting or for dipping, because the animals are more likely to remain within their nests after the treatment, giving better results in every way.

It is the nature of all fur-bearing animals to keep

themselves and their nests clean at all times. When they are raised in hutches, or in breeding pens under congested conditions, they cannot do so, therefore, the keeper must attend them; otherwise it is almost certain that they will contract ailments common to their kind, namely, sore feet, mange, vermin, etc.

If the place is kept clean, with the nests free of drafts, the attendant should have little to fear.

QUARANTINE STATION

The keeper of a fur ranch should provide a place of retention for all newly procured animals, whether caught in the wilds, or purchased from a ranch. This quarantine station should consist of a number of small pens constructed at a reasonable distance from the herd, where all incoming animals may be kept under observation for at least ten days for symptoms of infection common to their kind. If infection is found, the animals must be treated accordingly while they are at the quarantine station to prevent them from transmitting the infection to inmates of the ranch enclosures.

This retaining station will also be found extremely useful for isolating animals from the ranch, that become ill from time to time. In every instance when a pen at the quarantine station has been used for retaining a diseased animal; that pen, and all others at the station must be disinfected thoroughly, immediately after the animal has been removed, otherwise contagion would spread from one pen to another, and subsequently to healthy animals that might be placed within the pens for different reasons.

The additional expenditure necessary to equip this quarantine station is as nothing when compared with the many uses that the attendant will find for it.

If all essentials to sanitation are energetically adhered to, the attendant to a fur ranch will find very few ailments to contend with.

FIFTY FUR RAISING FACTS

The attendant to a fur ranch should keep a card system of all breeding stock to record the characteristics, disposition, and results obtained, for future reference at breeding or mating time.

With proper application of a logical line of reasoning, many perplexing problems may be mastered in fur raising, as well as in other fields of production.

From January 15 to February 15 fur-bearing animals of nearly every kind are practically indifferent to food of any kind, due to a peculiar provision of nature, or animal intuition to be comparatively thin at breeding time; fat animals do not breed so readily. This is especially true of foxes and raccoons.

All animals that are to be retained as breeders should be treated for worms in the late fall, and again just before mating time. The presence of worms in the parent stock at this time greatly lowers the vigor and stamina of their progeny.

After animals have been treated for worms, in the fall, all refuse from the breeding pens should be burned; all pens should then be covered with hay thoroughly sprinkled with kerosene and burned off. This destroys the worm eggs that would remain there during the winter, hatch out in the early spring and find their way to the intestines of the animals.

Apples may be fed to any kind of fur-bearing animals, they are extremely beneficial, and the animals relish them.

One-half an egg beaten and mixed with milk is a very appetizing and strengthening food for any sick animal, especially when it is convalescing.

If milk that is fed to animals is cooked, the vitamins, or growth promoting qualities are destroyed.

The milk of all small animals is very much richer in fat properties than that of cows. Then, if the milk that is fed to them is "separated" the young fur animals would not be getting the natural fat that their constitutions require. Therefore, this needed fat must be supplied from another source.

Considering the fox as a basis of size, about one-half ounce of codfish oil or gravy on food each day, for each animal, will supply the needed fat for the growing young. The amount for smaller animals may be given according to age. (This is in case the milk is separated.)

The attendant to a fur ranch who mistreats or frightens his animals today, can not expect them to trust in him tomorrow.

Remedy—A compound mixture in equal proportions of brains, good judgment, and gentle treatment—the trouble will cure itself within a reasonably short time.

If it were attempted to raise fur animals in keeping with instructions from some authorities (?), there would soon be need for more pelt stretchers on the ranch, than there would be for pens.

Oil of citronella is said to remove skunk odor from pelts and furs of any kind without injury, and from some fabrics.

Since there is nothing that is 100% certain, if the attendant to a ranch were to get 95% production from his breeding stock—whether domestic or otherwise—he would be doing well. Yet Mr. Knocker, who is always afraid someone will succeed, usually squawks out—“yes, but they won’t all breed.”

All entrances to the dens of fur-bearing animals should be encircled with a heavy coat of tar to prevent black ants and other obnoxious insects from entering the nests to the discomfort of the animals within. The tar-line should be at least one inch back from the edge of the entrance, to prevent it from pulling out the animal’s fur as they enter the den.

While inbreeding would probably be responsible for many undesirable defects among animals on the ranch, much may be accomplished through it by persons highly versed in the science of heredity, which may be acquired by a thorough study of the subject.

A daily ration of about 50% meat, 25% milk, and 25% cereals, fruit or vegetation, is considered sufficient for foxes.

Lamb products in general are considered extremely beneficial, as food, containing considerably more nourishing properties than almost any other kind of meat. Tuberculosis is almost unknown in lambs, therefore, all parts of lamb may be fed without fear of ill results. The liver, if slightly cooked, is especially good for any animals; cooked liver does not purge, as it will if eaten raw.

Imperfect diet around whelping time is responsible for the loss of many young animals at birth. The young are also frequently lost after they are born because of indiscreet feeding.

If cows' milk is allowed to come to a boil before it is fed to animals, it will aid in preventing stomach troubles. If the milk is slightly sweetened it will be of remarkable benefit to the young growing animals, because the addition of the sugar replaces the saccharine that boiling destroys.

Experiments have proved that overfeeding fur animals does not improve either their physique or their furs. Yet, underfeeding is the source of malnutrition which is productive of scrubby stock and poorly furred pelts. Success lies in a sufficient medium.

All mother animals should have an abundance of food during the period of lactation, to enable them to properly nourish their young.

Judicious feeding, proper nests and sanitation, are determining factors in successful fur raising.

Essentials in caring for and feeding young fur-bearing animals in general, are so strikingly similar to the requisites for rearing children, that an observing fur ranch attendant who has had experience with both, can not help recognizing it.

Sugar-beets are fine fur developers for animals of any kind because of the saccharine they contain.

It is constitutional with all wild fur animals that warm weather so affects the hair follicles that they cease to function, causing the animals to present dull, lifeless, unsightly coats of fur which they will soon shed. This leads some inexperienced attendants to believe that the animals have deteriorated, physically, under their care; but the approaching winter will bring with it an attractive transformation in the appearance and quality of their furs.

If all parts of animal pens are cleansed at frequent intervals, and kept clean, the attendant to a fur ranch will have very few complications to contend with. Filth on a fur ranch is a vehicle that carries many disease germs with it.

A little molasses fed on the food for fur animals is wonderfully instrumental in giving gloss to the furs. The animals will soon cultivate a taste for the molasses, and relish it with their meals.

Goat's milk being much richer in fat and growth promoting qualities than that of the cow, it would naturally be expected to provide a much more desirable food for

young fur animals, because their own mothers' milk is even richer than that of goats.

In northern climates fur animals' skins are thin and their furs thick. In southern climates the fur is thin and the skin is thick.

No animal should be admitted to the ranch until it has undergone about ten days of observation to determine if it is physically fit to enter the colony.

Young fur animals should be fed all they will eat from the time they begin to consume solid food until they are full grown about November 1 to 15, for it is during that period of adolescence that they attain their size, and in that time they eat considerably more than do adults. But those to be pelted should not be too fat at pelting time in January. However, they are not likely to be too fat at that time because they stay in their dens most of the time during very cold weather, losing much of the fat which they previously accumulated.

It is claimed by some authorities that a little common table salt in warm milk will eradicate intestinal worms from skunks within a few days.

Gravy, made from any kind of meat, thickened with flour and skimmed milk, and poured over stale bread or animal biscuits will supply a great deal of the fat necessary to young growing animals; they like it.

There seems to be a common custom among fox raisers to feed their animals meat in the morning, and milk

with bread or cereals in the evening. Theroetically, it would appear that this manner of feeding should be reversed, because it is certain that all carnivorous animals, in the wilds, seek their food at night, beginning about dark, when they procure their meat by devouring the smaller animals upon which they prey, and inasmuch as they do not return to their dens until about daybreak, it is likely that it is in the morning when the nursing youngsters would get the most of their milk. It is reasonably certain that they do not get it in the forepart of the evening.

Health and disease among animals are physical conditions upon which success and failure depend. Sanitation and proper food are governing factors in both conditions.

Dark spots showing on the flesh side of pelts are indicative of an immature condition, greatly lowering the selling price; this condition should rarely occur on a ranch where the animals are judiciously fed and where they may be taken at will.

When the pelt of any fur animal is prime, even after it becomes a constituent part of a garment the fur will stand up straight and fluffy, while that of an immature pelt will lay more or less flat, according to the degree of development.

Muskrats exposed to cold winds die within a short time, also the sun's hot rays in mid-summer will kill them as readily if they are subjected to it.

The "rickets," to which all confined animals are subject, is usually caused by lack of enough lime substance in their food to build strong bones and joints in the young while they are growing. Rickets, as well as other deformations may also be caused by inbreeding.

A teaspoonful of sulphate of iron mixed with about four gallons of water and given every second day, with no other water to drink on those days, is said to be a positive preventive of worms in skunks. It is inexpensive.

An effective way to give castor oil to skunks is by mixing it with chopped particles of chicken, which they will eat readily.

A drop of gasoline will kill a tick on any animal.

In dosing young foxes for worms, be sure to give them the "puppy size" capsules, or doses.

When animal biscuits are fed to very young foxes, (when they first begin to eat solid food,) they should be soaked in fresh milk or gravy long enough to soften them so that they will be easily digested.

When raw meat is first fed to young foxes (at about two months of age) it should be given sparingly. It should be ground, then placed in the milk with the biscuits. Not more than a teaspoonful to each cub should be given at first; the allowance should be increased gradually.

When fur animals are given more meat than they will eat, at one time, during winter weather, they will be inclined to drag the remaining portion into their dens, especially just previous to an extreme drop in the temperature—an intuition forecast by a strange provision of nature.

While nesting in the earth is conducive to better furs, it is also a source from which animals contract intestinal worms.

Underfeeding is a source of malnutrition hindering the general constitution of animals, while overfeeding has nothing to recommend it.

Mulberry trees and elderberry bushes should be planted within the pens of all fur-bearing animals; they are fond of these berries and the trees furnish shade for the animals.

Cleanliness is a measure so preventive of contagion that the fur ranch attendant who neglects it, only invites trouble and expense to himself.

When it is observed that a female fur animal bears large litters, her offspring should be retained for breeding stock, thereby increasing the average animal production.

Since it is the nature of foxes to dig their way to obscurity when making dens in which to bear their young, it is reasonably certain that absolute darkness within the nest-box is as essential to successful fox raising as it is to successful mink raising.

Success in raising fur-bearing animals in captivity is largely (but not wholly) contingent upon two factors—feeding and the kinds of food given. It should be borne in mind by the attendant that since the judicious preparation of their food is not more important than the art of feeding it, as much may be accomplished by one of these essentials as by the other.

A number of arboreal animals, especially raccoons, occupying the same tree, will soon kill it.

People who are the quickest to comment unfavorably upon the possibilities offered in the fur raising business are invariably those who are least qualified to criticise it. These disparaging censures come solely from persons who think only in terms of prophetic skepticism, without a foundation for their thoughts.

In seeing his students succeed in fur raising, lies the author's immeasurable compensation and gratitude complete for the work and endless research he has contributed to that end.

The Farmer Boys of Today, to whom this business rightfully belongs, *should be the fur raisers of tomorrow*, when the old trapline and the lure of the wild-woods will remain only in pleasant memory of the days of long ago.

INDEX

- Advertising, 51, 54, 185.
 Altitude, effect on fur, 34, 45.
 Animal biscuits, 420-421.
 Animal brokers, 51-52.
 Animal increase, 56.
- Back-yard ranch, 52-53, 66, 202-206, 344-347.
 Barn system, mink raising, 208-211.
 Beaver, breeding, 316; durability of fur, 55; feeding, 306, 317, 318; nest-boxes, 314-315; pens, 66, 70, 313-314; price of live animal, 55; price of pelt, 53; prime season, 426; ranching, 312-313; skinning and curing, 318-319, 432; wild, 303-312.
 Beaver coney, 23.
 Biscuits, animal, 420-421.
 Blindness, muskrat, 112-113, 116.
 Blood purifier, 446.
 Blood stains, removing, 440.
 Blue fox, 124.
 Boric acid solution, 448.
 Breeding, 452; beaver, 316; fox, 160-165; guinea-pig, 388-389; marten, 290-291; mink, 215-216, 221, 231-235; muskrat, 108-111; opossum, 326-327; otter, 278, 280-281; rabbit, 398, 400-403; raccoon, 262-264; skunk, 358-361.
 Breeding stock, procuring, 50-52, 196; selling, 54, 185.
 Brokers, animal, 51-52.
 Brook mink, 23, 91.
- Caloric food values, 421-423.
 Cat, 23.
 Cavy, *see* Guinea-pig.
 Cleansing furs, 442.
 Climate, effect on fur ranching, 32-33.
 Cold storage, 441.
 Coney, 23, 55.
 Constipation, 441.
 Convulsions, 411-412.
- Corralling, 104-105.
 Curing, 432; fox, 182-184, 432; muskrat, 115-116; opossum, 327-328.
- Deer, 416.
 Demand for furs, 20, 24, 25, 38-39, 40, 218.
 Den construction, 67-68, 107, 142-149, 149-150, 314-315, 355-358.
 Deodorizing, pelts, 440, 454; skunk, 343, 371-377.
 Dip solution, 244, 379-380, 447-448.
 Disinfectant, 447, 449.
 Distemper, skunk, 380-381.
 Durability of furs, 55.
- Ear canker, 409-410; fox, 176-177.
 Electric seal, 23, 91.
 Ermine, durability of fur, 55; pens, 63, 301-302; trapping, 27-28; wild, 300-301.
 Examining box, 239-240.
 Eyes, sore, 410, 444.
- Farm, raising wild animals on, 34-35, 41-45, 329-330.
 Feeding, 424-425, 453, 455, 456, 457, 460; beaver, 306, 317, 318; fisher, 295, 298, 423; fox, 151-152, 154-159, 168-169, 174-175, 422-423; marten, 289-290, 423; mink, 225-231, 423; muskrat, 98-99, 102, 103, 111; opossum, 326, 423; otter, 274-275, 279-280; raccoon, 249, 259-262, 423; rabbit, 399, 403; skunk, 352, 353, 361-364, 423.
 Fence construction, 62-67, 97-98, 100, 102, 132-142, 207, 278, 297, 301-302, 313-314, 348-349, 406.
 Feet, sore, 410, 443-444.
 Fisher, durability of fur, 55; feeding, 295, 298, 423; nest boxes, 298; pens, 63, 65, 71, 297; price of live animal, 55; price of pelt, 53; prime season, 427; ranching, 297; requirements for raising, 56; ship-

Fisher—*Continued*

- ping pelts, 432; skinning and curing, 430-439; wild, 293-296.
- Food values, 421-423.
- Fox, breeding, 160-165; care, 150-154, 165-173; dens, 142-149; 149-150; diseases, 175-182, 459; durability of fur, 55; feeding, 154-159, 168-169, 174-175, 422-423, 454, 456-457; killing, 182; mating, 159-164; pens, 63, 66, 71, 132-142; prime season, 427; profits, 37-38, 58; ranch, 131-132; raised on farm, 43; shipping pelts, 432; skinning and curing, 182-184, 432; wild, 118-123.
- Fox, blue, 124.
- Fox, red, price of live animal, 55; price of pelt, 53; profits, 58.
- Fox, silver, 125-131; price of live animal, 55; price of pelt, 24, 53; profits, 37.
- French seal, 23, 91.
- Fur business, history, 19-25.
- Fur ranch, location, 14, 31-34; profits, 35-40.
- Genet fur, 23.
- Grading pelts, 441.
- Guinea-pig, characteristics, 385-388; market, 388; breeding, 388-389, 392-394; pens, 389-391; feeding, 391-392; diseases, 394.
- Habitat, effect on fur, 31-34, 45, 151.
- Hare, 413-414.
- Hocks, sore, 243-244; 411.
- Hudson seal, 23, 91.
- Humidity, effect on fur, 33, 34, 45.
- Hutches, rabbit, 404-405.
- Imitation furs, 22-23.
- Increase, rate of animal, 56.
- Insects, keeping off, 454.
- Intestinal troubles, rabbit, 411.
- Jap mink, 55, 189.
- Karakul, 417.
- Killing, 428-429; fox, 182; muskrat, 114-115; raccoon, 266.
- Killing box, 429-430.
- Kolinsky, 55, 189.
- Laxation, 242-243, 267, 378, 445-446.
- Lime-water, 423-424.
- Live animals, prices, 54-55, 189.
- Location of fur ranch, 31-34, 131.
- Magazines, fur, 61.
- Mange, 177-178, 268, 381, 409, 444-445.
- Marking fur animals, 234-235, 317, 383, 427-428.
- Marten, breeding, 290-291; care, 292; durability of fur, 55; feeding, 289-290, 423; nest boxes, 287, 288-289; pens, 65, 71, 287-288; price of live animal, 55; prime season, 427; price of pelt, 53; ranching, 286-287; requirements for raising, 56; shipping pelts, 432; skinning and curing, 430-439; wild, 282-286.
- Marten, pine, 282-285.
- Marten, stone, 55, 282-285.
- Mink, barn system of raising, 208-211; breeding, 215-216, 221, 231-235; care, 235-238, 240-242; catching, 196-197, 199; diseases, 242-245; durability of fur, 55; feeding, 225-231, 423; nest boxes, 222-225; pens, 65, 70, 203-205, 206-208, 213-218, 219-222; price of live animal, 55; price of pelt, 24, 53; prime season, 426; raised in back yard, 52-53, 202-206; raised in family developing pens, 219-222; raised in open developing field, 211-218; raised on farm, 41, 43; ranching, 197-201; rate of increase, 56; shipping pelts, 432; skinning and curing, 430-439; wild, 188-195.
- Mink, brook, 23, 91.
- Mink, Jap, 55.
- Mink, river, 23.
- Mole, 415.
- Mole coney, 23.
- Muskrat, breeding, 108-111; care, 104-105, 114; diseases, 116-117; durability of fur, 55; dry land ranching, 103-104; dyed, 23; feeding, 98-99, 102, 103, 111; killing, 114-115; nest boxes, 106-107; pens, 66, 70, 97-98, 99, 100-102; price of live animal, 55; price of pelt, 24,

Muskrat—Continued

53, 91; prime season, 426; profits, 58, 111; raised on farm, 41, 43; raised on house roof, 13; rate of increase, 56; shipping pelts, 432; skinning and curing, 115-116, 432; under full control, 100-102; under semi-control, 95-99; wild, 72-95.

Nest boxes, 106-107, 145-147, 205, 222-225, 279, 287, 288-289, 298, 314-315, 346, 355-358, 390.

Nutria coney, 23.

Opossum, breeding, 326-327; care of young, 327; durability of fur, 55; feeding, 326, 423; pens, 66, 70-71, 325; price of live animal, 55; price of pelt, 53; prime season, 426; ranching, 324-325; raised on farm, 43; rate of increase, 56; shipping pelts, 327, 432; skinning and curing, 327-328, 432; wild, 320-323.

Otter, breeding, 278, 280-281; diseases, 281; durability of fur, 55; feeding, 274-275, 279-280; nest boxes, 279; pens, 66, 70, 278; price of live animal, 55; price of pelt, 53; ranching, 277-278; requirements for raising, 56; shipping pelts, 432; skinning and curing, 430-439; wild, 269-277.

Otter, sea, 281.

Pekan, *see* Fisher.

Pelts, prices, 24, 37, 53; selling, 185; shipping, 327, 432.

Pen construction, 62-67, 97-98, 99, 100-102, 132-142, 203-205, 206-208, 213-218, 219-222, 278, 287-288, 297, 301-302, 313-314, 325, 345-346, 347-358, 404-407.

Pine marten, 282-285.

Pneumonia, 267, 268, 281, 378-379, 445-446.

Prices of live animals, 54-55.

Prices of pelts, 24, 37, 53.

Prime season, 426-427.

Profits, 35-40.

Quarantine station, 450-451.

Rabbit, as animal food, 39-40, 53, 154, 225-226, 261, 279, 395-396; breeding, 398, 400-403; care of young, 403-404; diseases, 407-412; distinguished from hares, 412-414; durability of fur, 55; feeding, 399, 403; handling, 412; rate of increase, 56; shipping pelts, 432; skinning and curing, 432; raised in back yard, 53; used as imitation, 23.

Raccoon, breeding, 262-264; care of young, 265-266; diseases, 267; durability of fur, 55; feeding, 249, 259-262, 423; killing, 266; nest boxes, 258-259; pens, 66, 70, 255-257; price of live animal, 55; price of pelt, 24, 53; prime season, 426; raised in back yard, 52; raised on farm, 43; ranching, 252-255; rate of increase, 56; skinning and curing, 266, 432; wild, 246.

Ranch raised furs, superior to wild, 30, 45-50, 91-92, 213, 356.

Red fox, price of live animal, 55; price of pelt, 53; profits, 58.

Rickets, 178, 459.

River mink, 23.

Sable, 23, 282.

Sea otter, 281.

Scent baits, 439-440.

Seal, electric, 23; French, 23; Hudson, 23.

Sealine, 23.

Selling prices of live animals, 54-55.

Selling prices of pelts, 24, 37, 53, 60.

Shipping, fox, 186-187; skunk, 333-334, 382; pelts, 432; opossum pelts, 327.

Silver fox, 125-131; price of live animal, 55; price of pelt, 24, 53, 128-129; profits, 37, 58.

Skinning, 432; fox, 182-184, 432; muskrat, 115-116; opossum, 327-328; raccoon, 266.

Skunk, beauty of fur, 23, 55; breeding, 358-361; care, 364-365, 370-371, 382-384; deodorizing, 343,

Skunk—*Continued*

- 371-377; diseases, 377-381, 459;
feeding, 352, 353, 361-364, 370, 383,
384, 423; pens, 66, 70-71, 345-346,
347-358; price of live animal, 55;
price of pelt, 24, 53; prime sea-
son, 426; raised in back yard,
52, 344-347; raised on farm, 43,
329-330; ranching, 341-344; rate
of increase, 56; shipping, 333-334,
382; shipping pelts, 432; skinning
and curing, 432; used as sable, 23;
wild, 329-341.
- Slobbers, 408-409.
Snuffles, 407-408.
Soil, effect on fur, 31, 151.
Sores, 240-244, 411, 443-444.
South, fur raising in, 418-419.
- Stone marten, 55, 282-285.
Squirrel, 55.
Stretchers for curing pelts, 433-437.
- Ticks, 447, 459.
Transfer box, 238.
Tonics, 446.
Trapping evils, 26-29, 47.
- Vermin, 116-117, 178, 377, 379-380,
448-449.
- Warbles, 411.
Wild animal, inferior to ranch
raised, 30, 45-50, 91-92, 213, 356.
Worms, 178-182, 268, 377, 379, 452,
459.
Wounds, 443.

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